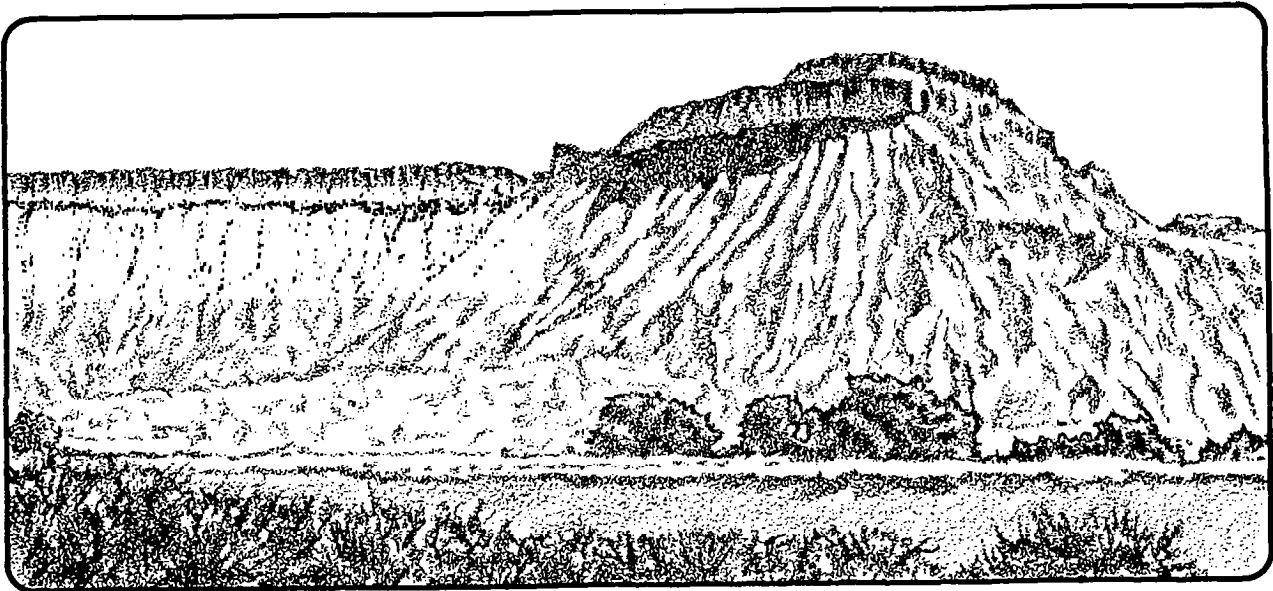


DRAFT
March 1985

GRAND JUNCTION RESOURCE AREA



Resource Management Plan and Environmental Impact Statement

**U.S. Department of the Interior
Bureau of Land Management
Grand Junction District
Colorado**

Grand Junction District Office
764 Horizon Drive
Grand Junction, Colorado 81506

NOTICE

Enclosed for your review and comment is the draft Grand Junction Resource Management Plan and Environmental Impact Statement. Your comments are invited on the alternatives presented and on the adequacy of the impact analysis.

Public hearings have been arranged in four locations to receive oral testimony on this resource management plan. All hearings will run from 7:30 to 8:30 p.m. at the following locations.

<u>Location</u>	<u>Date</u>
BLM District Office 764 Horizon Drive Grand Junction, Colorado	May 13, 1985
Community Center Gateway, Colorado	May 14, 1985
Delta Middle School 822 Grand Avenue Delta, Colorado	May 15, 1985
Ramada Inn Foothills 11595 West Sixth Avenue Denver, Colorado	May 20, 1985

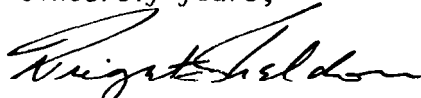
The primary purpose of the hearings is to receive comments on the wilderness recommendations in this resource management plan. However, testimony will also be accepted on other parts of the document.

Prior to each hearing, an open house will be held to give you an opportunity to discuss the resource management plan with some of the specialists who helped develop it. Open houses will run from 6:30 to 7:30 p.m.

In addition to oral testimony, written comments will be accepted until close of business on July 3, 1985. Whether written or oral, all comments will be considered in developing a final resource management plan and environmental statement.

Please address your written comments or questions to Forest Littrell, Bureau of Land Management, Grand Junction Resource Area, 764 Horizon Drive, Grand Junction, Colorado.


Sincerely yours,



District Manager

**DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON THE
GRAND JUNCTION RESOURCE MANAGEMENT PLAN**

**Prepared by
U.S. Department of the Interior
Bureau of Land Management**


**DISTRICT MANAGER
GRAND JUNCTION DISTRICT OFFICE**

I concur:


**Associate STATE DIRECTOR
COLORADO STATE OFFICE**

RESOURCE MANAGEMENT PLAN AND
ENVIRONMENTAL IMPACT STATEMENT

Draft (X)

Final ()

GRAND JUNCTION RESOURCE AREA
GRAND JUNCTION, COLORADO

Lead Agency

U. S. Department of the Interior, Bureau of Land Management

Type of Action

Administrative (X)

Legislative ()

ABSTRACT

This draft resource management plan and environmental impact statement for the Grand Junction Resource Area describes and analyzes four alternatives for managing public land resources in the Grand Junction Resource Area. They are the (1) Continuation of Current Management Alternative, (2) Commodity Alternative, (3) Protection Alternative, and (4) Preferred Alternative. The Preferred Alternative represents BLM's favored option for managing public land in the Grand Junction Resource Area.

For further information regarding this environmental impact statement contact:

Forest Littrell, Area Manager
Bureau of Land Management
Grand Junction Resource Area
764 Horizon Drive
Grand Junction, Colorado 81506
Telephone: (303) 243-6552

Date by which Comments Must be Received: July 3, 1985

Please keep this draft RMP to use in conjunction with the final RMP, scheduled for publication in November 1985. If changes in the draft RMP are minor, the final RMP will include only those changes and will not be a reprint of the entire draft RMP.

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SUMMARY

SUMMARY

ALTERNATIVES ADDRESSED

A total of four alternatives for managing public land resources within the Grand Junction Resource Area are examined in detail in this resource management plan/environmental impact statement (RMP/EIS). They are the Continuation of Current Management Alternative, Commodity Alternative, Protection Alternative, and Preferred Alternative.

The Continuation of Current Management Alternative is the No Action Alternative required by the Council on Environmental Quality. The Commodity and Protection Alternatives provide a range of choices from those actions favoring resource development to those favoring resource protection. The Preferred Alternative incorporates management actions that reflect the range of those developed in each of the other alternatives.

SUMMARY OF ALTERNATIVE ALLOCATIONS

The resource management proposals for each alternative are summarized below. A comparison of impacts, by alternative are summarized at the end of Chapter 4.

Continuation of Current Management Alternative

Under the Continuation of Current Management Alternative, emphasis would be placed on managing resources at current levels. Any new proposals would have to be consistent with these levels.

Existing air quality in the resource area would be maintained within the designated nonattainment area through project design.

Projects on suitable soils would be designed to minimize soil loss. In the Baxter/Douglas Pass area, 18,000 acres would be managed to exclude surface occupancy and limit surface disturbance because of high soil slump hazard.

Water quality degradation would be minimized through project design. Approximately 117,000 acres would be managed to reduce sediment, and about 133,000 acres would be managed to reduce salinity. A total of 27.3 miles of critically eroding stream channels would be treated. Existing sediment and salinity control structures in Indian Wash and Leach Creek would be maintained. Studies would continue in Badger Wash hydrology study

area and Sinbad Valley. The Palisade municipal watershed would be protected from surface-disturbing activities.

Existing withdrawals from mineral location on 124,843 acres would continue. An additional 68,000 acres would be withdrawn to protect recreation values.

Approximately 14,100 acres would be identified as unsuitable for further coal leasing consideration based upon coal unsuitability criteria. An additional 24,421 acres in the Little Book Cliffs Wild Horse Range would be identified as unacceptable based upon multiple use tradeoffs.

Approximately 608,383 acres would be identified as open to oil and gas leasing without stipulations, and approximately 482,771 acres would be identified as open to oil and gas leasing with stipulations. An additional 111,838 acres would be identified as closed to oil and gas leasing, and 256,399 acres would be considered on a case-by-case basis.

Existing closures to mineral material sales on 6,188 acres would continue. An additional 97,638 acres would be closed to protect a variety of resource values.

The Morrison and Wasatch Formations would be designated as Class I paleontological areas. The Fruita and Rabbit Valley paleontological sites would continue to be managed for scientific and educational purposes.

Approximately 2,600 cords of fuelwood would be offered for sale annually. No commercial forest land areas would be identified as suitable for management. An annual allowable harvest would be established only after completion of a timber production capability classification.

Habitat of the major wildlife species would be actively managed. Habitat provided would be capable of supporting a deer population of 34,400 in winter and 15,500 in summer and an elk population of 2,950 in winter and 870 in summer. Sensitive big game habitat would be protected by placing stipulations on development. A total of 71 miles of trout streams would be managed for sport fisheries.

Habitat of unique, sensitive, and endangered plants and animals would be identified for active management and protection. Unaweep Seep and Pyramid Rock would be designated as special management areas.

No new livestock management actions would be proposed. Livestock grazing, as described in the *Grand Junction Livestock Grazing Environmental*

Summary

Statement, would continue and would be consistent with Bureau policy.

The Little Book Cliffs Wild Horse Range would be managed to accommodate a herd of from 65 to 120 wild horses. Foaling areas in Coal Canyon would be protected from all surface-disturbing activities except development of existing coal leases. No additional coal leases would be issued in Coal Canyon.

Cultural resources would be protected from surface-disturbing activities as required by law. Approximately 1,290 acres of archaeological sites would be identified for active management.

The three existing developed recreation sites would continue to be managed. Two intensive recreation management areas would be identified. The remainder of the resource area would be managed as an extensive recreation management area.

Approximately 173,374 acres would be designated as Class II for visual resource management. An additional 161,821 acres would be designated as Class III. The remaining 944,865 acres would be undesignated.

The majority of the resource area (1,058,472 acres) would be classified as open to off-road vehicle (ORV) use. Critical and fragile resource values would be protected from damage caused by ORV use.

The seven wilderness study areas would be recommended as nonsuitable for wilderness designation.

Land tenure adjustment proposals would be processed and analyzed as received, based upon available funding. No tracts would be identified for disposal. However, if proposals were made, primary emphasis for disposal would be on exchanges, and secondary emphasis would be on sales. Five tracts, totaling 896 acres, would be identified for acquisition.

Easements on 17 miles of roads and one-half mile of trails identified in approved activity plans would be acquired. Other easements would be acquired only as specific management problems were encountered.

Three zones would be identified to guide the development of utilities: suitable for development (470,339 acres), sensitive to development (618,842 acres), and unsuitable for development (191,119). The use of existing routes would be encouraged. All proposals to construct public utilities would be considered as received.

Fire on public land would be managed as directed by five fire response levels: critical (0 acres), full (792,658 acres), limited (460,402 acres), prescribed (27,000 acres), and wilderness (0 acres). These

levels support the objectives of other resource programs.

Commodity Alternative

The Commodity Alternative would place primary emphasis on making public land and resources available for public use and development. Environmental values would be protected only to the extent required by law or regulation. New proposals would be allowed to the extent they would not unduly restrict other resources' abilities to produce goods and services.

Existing air quality in the resource area would be maintained within the designated nonattainment area through project design.

Projects on suitable soils would be designed to minimize soil loss. In the Cactus Park area, 800 acres would be stabilized through reseeding and by limiting vehicular access.

Water quality degradation would be minimized through project design. Approximately 175,600 acres would be managed to reduce sediment, and about 146,300 acres would be managed to reduce salinity. Approximately 63 miles of critically-eroding stream channels would be treated. Existing sediment and salinity control structures in Indian Wash and Leach Creek would be maintained. Studies would continue in Badger Wash hydrology study area and Sinbad Valley. The Palisade municipal watershed would be protected from surface-disturbing activities.

Existing withdrawals from mineral location on 124,843 acres would continue. No additional withdrawals would be proposed.

Approximately 14,100 acres would be identified as unsuitable for further coal leasing consideration based upon coal unsuitability criteria. No additional area would be determined unacceptable.

Approximately 1,125,664 acres would be designated as open to oil and gas leasing without stipulations, and approximately 333,727 acres would be designated as open to oil and gas leasing with stipulations. None of the resource area would be designated as closed to leasing, and no areas would be left undesignated.

Existing closures to mineral material sales on 6,188 acres would continue. An additional 2,692 acres would be closed to protect resource values.

The Morrison and Wasatch Formations would be designated as Class I paleontological areas. The Fruita and Rabbit Valley paleontological sites would continue to be managed for scientific and educational purposes.

Summary

Approximately 3,200 cords of fuelwood would be offered for sale annually in the resource area. No commercial forest land areas would be identified as suitable for management. An allowable harvest would be established only after completion of a timber production capability classification.

Habitat of the major wildlife species would be actively managed. Habitat provided would be capable of maintaining the current deer population of 25,700 in winter and 12,800 in summer and the current elk population of 2,750 in winter and 850 in summer. Approximately 75,600 animal unit months (AUMs) would be allocated to deer and elk. Sensitive big game habitat would be protected by placing stipulations on development. A total of 97 miles of trout streams would be managed for sport fisheries.

Habitat of unique and sensitive plants and animals would be identified for active management and protection. Important habitat of listed threatened and endangered species would be protected. Unaweep Seep would be designated as a special management area.

No new livestock management actions would be proposed. Livestock grazing would be managed as described in the *Grand Junction Livestock Grazing Environmental Statement*.

The Little Book Cliffs Wild Horse Range would be managed to accommodate a herd of from 65 to 120 wild horses. The wild horse range would be expanded by 2,380 acres to include historically used winter range. Critical foaling and wintering areas in Coal Canyon would be protected. Identifying Coal Canyon as available for further coal leasing pending further study and mitigating any adverse impacts from coal development would ensure a viable horse herd is maintained.

Cultural resources would be protected from surface-disturbing activities as required by law. Approximately 2,105 acres of archaeological sites would be identified for active management.

The three existing developed recreation sites would continue to be managed. The Mud Springs site would be expanded to accommodate more group use. A total of 17 roadside rest stops would be developed. Nine intensive recreation management areas would be identified. The remainder of the resource area would be managed as an extensive recreation management area.

None of the resource area would be placed in visual resource management (VRM) classes. All 1,280,060 acres would be left undesignated.

The majority of the resource area (1,067,537 acres) would be classified as open to off-road-vehicle (ORV) use. Critical and fragile resource values would be protected from damage caused by ORV use.

The seven wilderness study areas would be recommended as nonsuitable for wilderness designation.

Two hundred seven tracts, totaling 41,550 acres, would be identified for disposal. Primary emphasis for disposal would be on exchanges, and secondary emphasis would be on sales. Seven tracts of private land, totaling 1,049 acres, would be identified for acquisition.

Easements on 80.75 miles of roads and 6.75 miles of trails would be acquired for a variety of resource management needs.

Three zones would be identified to guide the development of utilities: suitable for development (766,385 acres), sensitive to development (511,443 acres), and unsuitable for development (2,232 acres). The use of existing routes would be encouraged.

Fire on public land would be managed as directed by five fire response levels: critical (32,000 acres), full (573,019 acres), limited (642,441 acres), prescribed (32,600 acres), and wilderness (0 acres). These levels support the objectives of other resource programs.

Protection Alternative

The Protection Alternative would emphasize the maintenance or improvement of environmental values and fragile and unique resources. New resource use and development would be permitted to the extent of their compatibility with the environmental protection emphasis.

Existing air quality in the resource area would be maintained within the designated nonattainment area through project design.

Projects on suitable soils would be designed to minimize soil loss. In the Baxter/Douglas Pass area 18,000 acres would be managed to exclude surface occupancy and limit surface disturbance because to the high soil slump hazard. In the Cactus Park area, 1,500 acres would be stabilized through limiting access and by reseeding. No surface occupancy or disturbance would be allowed on steep slopes (those over 40 percent).

Water quality degradation would be minimized through project design. Approximately 164,700 acres would be managed to reduce sediment, and an additional 146,300 acres would be managed to reduce salinity. A total of 58.1 miles of critically eroding stream channels would be treated. Existing sediment and salinity control structures in Indian Wash and Leach Creek would be maintained. Studies would continue in Badger Wash research area and Sinbad Valley. The Palisade municipal water-

Summary

shed would be protected from surface-disturbing activities.

Existing withdrawals from mineral location on 124,843 acres would continue. An additional 441,219 acres would be withdrawn to protect resource values.

Approximately 14,100 acres would be identified as unsuitable for further coal leasing consideration based upon coal unsuitability criteria. An additional 127,252 acres would be identified as unacceptable based on multiple use tradeoffs.

Approximately 471,595 acres would be designated as open to oil and gas leasing without stipulations, and approximately 735,241 acres would be designated as open to oil and gas leasing with stipulations. An additional 252,555 acres would be identified as closed to oil and gas leasing and no areas would be left undesignated.

Existing closures to mineral material sales on 6,188 acres would continue. An additional 612,606 acres would be closed to protect resource values.

The Morrison and Wasatch Formations would be designated as Class I paleontological areas. The Fruita and Rabbit Valley paleontological sites would continue to be managed for scientific and educational purposes. These areas would also be designated as research natural areas.

Approximately 2,200 cords of fuelwood would be offered for sale annually in the resource area. No commercial forest land areas would be identified as suitable for management. An allowable harvest would be established only after completion of a timber production capability classification.

Habitat of the major wildlife species would be actively managed. Habitat provided would be capable of supporting a deer population of 34,400 in winter and 15,500 in summer and an elk population of 2,950 in winter and 870 in summer. Sensitive big game habitat would be protected by placing stipulations on development. A total of 71 miles of trout streams would be managed for sport fisheries.

Habitat of unique, sensitive, and endangered plants and animals would be identified for active management and protection. Unaweep Seep and Pyramid Rock would be designated as special management areas.

No livestock management actions would be proposed. Livestock grazing would be managed as described in the Grand Junction Livestock Grazing Environmental Statement.

The Little Book Cliffs Wild Horse Range would be managed to accommodate a herd of from 65 to 120 wild horses. The wild horse range would be expanded by 2,380 acres to include historically used winter range. Foaling and wintering areas in Coal

Canyon would be protected from all disturbing activities except the development of existing coal leases.

Cultural resources would be protected from surface-disturbing activities as required by law. Approximately 12,990 acres of archaeological sites would be identified for active management.

The three existing developed recreation sites would continue to be managed. The Mud Springs site would be expanded to accommodate group use. An area north of Collbran would be managed as a quality hunting area. Eight intensive recreation management areas would be identified. The remainder of the resource area would be managed as an extensive recreation management area.

Approximately 273,995 acres would be designated as Class I for visual resource management (VRM). An additional 180,820 acres would be designated as Class II. The remaining 825,245 acres would be undesignated.

The majority of the resource area would be classified as closed or limited to off-road vehicle (ORV) use. About 3,600 acres would be classified as open to ORV use. Critical and fragile resource values would be protected from damage caused by ORV use.

The seven wilderness study areas would be recommended as preliminarily suitable for wilderness designation. Wilderness boundaries would be expanded to improve manageability.

Ninety-one tracts, totaling 7,635 acres, would be identified for disposal. Primary emphasis for disposal would be on exchanges, and secondary emphasis would be on sales. Fourteen tracts, totaling 3,579 acres, would be identified for acquisition.

Easements on 71.75 miles of roads and 6.25 miles of trails would be acquired for a variety of resource management needs.

Three zones would be identified to guide the development of utilities: suitable for development (115,729 acres), sensitive to development (761,532), and unsuitable for development (402,799). The use of existing routes would be encouraged.

Fire on public land would be managed as directed by five fire response levels: critical (22,300 acres), full (412,489 acres), limited (423,964 acres), prescribed (27,000 acres), and wilderness (394,307 acres). These levels support the objectives of other resource programs.

Summary

Preferred Alternative

The Preferred Alternative represents the Bureau's favored management approach. It includes aspects from the other three alternatives and would provide a rational and balanced approach to public land management.

Existing air quality in the resource area would be maintained within the designated nonattainment area through project design.

Projects on suitable soils would be designed to minimize soil loss. In the Baxter/Douglas Pass area 18,000 acres would be managed to exclude surface occupancy and limit surface disturbance because of the high soil slump hazard. In the Cactus Park area, 1,000 acres would be stabilized through limiting access and by reseeding. Surface occupancy and disturbance would be limited on steep slopes (those over 40 percent).

Water quality degradation would be minimized through project design. Approximately 140,500 acres would be managed to reduce sediment, and an additional 146,300 acres would be managed to reduce salinity. A total of 63.3 miles of critically-eroding stream channels would be treated. Existing sediment and salinity control structures in Indian Wash and Leach Creek would be maintained. Studies would continue in Badger Wash research area and Sinbad Valley. The Palisade and Grand Junction municipal watersheds and Jerry Creek Reservoirs would be protected from surface-disturbing activities.

Existing withdrawals from mineral location on 124,443 acres would continue. An additional 154,067 acres would be withdrawn to protect resource values.

Approximately 14,100 acres would be identified as unsuitable for further coal leasing consideration based upon coal unsuitability criteria. No additional area would be identified as unacceptable.

Approximately 624,701 acres would be designated open to oil and gas leasing without stipulations, and approximately 685,603 acres would be designated as open to oil and gas leasing with stipulations. An additional 149,087 acres would be designated as closed to oil and gas leasing, and no areas would be left undesignated.

Existing closures to mineral materials sales on 6,188 acres would continue. An additional 281,988 acres would be closed to protect resource values.

The Morrison and Wasatch Formations would be designated as Class I paleontological areas. The Fruita and Rabbit Valley paleontological sites would continue to be managed for scientific and educational purposes. These areas would also be designated as research natural areas.

Approximately 2,800 cords of fuelwood would be offered for sale annually in the resource area. Approximately 1,319 acres of commercial forest land also would be identified as suitable for management. An allowable harvest would be established only after completion of a timber production capability classifications.

Habitat of the major wildlife species would be actively managed. Habitat provided would be capable of supporting a deer population of 34,400 in winter and 15,500 in summer and an elk population of 2,950 in winter and 870 in summer. Sensitive big game habitat would be protected by placing stipulations on development. A total of 71 miles of trout streams would be managed for sport fisheries.

Habitat of unique, sensitive, threatened and endangered plants and animals would be identified for active management and protection. Unaweep Seep and Pyramid Rock would be designated as special management areas.

No new livestock management actions would be proposed. Livestock grazing, as described in the *Grand Junction Livestock Grazing Environmental Statement*, would continue and would be consistent with Bureau policy.

The Little Book Cliffs Wild Horse Range would be managed to accommodate a herd of from 65 to 120 wild horses. The wild horse range would be expanded by 2,380 acres to include historically used winter range. Critical foaling and wintering areas in Coal Canyon would be protected. Identifying Coal Canyon as available for further coal leasing pending further study and mitigating any adverse impacts from coal development would ensure a viable horse herd is maintained.

Cultural resources would be protected from surface-disturbing activities as required by law. Approximately 11,685 acres of archaeological sites would be identified for active management.

The three existing developed recreation sites would continue to be managed. The Mud Springs site would be expanded to accommodate more group use. Three intensive recreation management areas would be identified. The remainder of the resource area would be managed as an extensive recreation management area.

Approximately 154,200 acres would be designated as Class I for visual resource management (VRM). An additional 106,520 acres would be designated as Class II, 180,481 acres as Class III, and the remaining 838,499 acres would be undesignated. The Palisade above Gateway would be designated an outstanding natural area to protect scenic values.

Summary

Approximately 800,190 acres would be designated as closed or limited to off-road vehicle (ORV) use. An additional 479,870 acres would be designated as open to ORV use. Critical and fragile resource values would be protected from damage by ORV use.

A total of 149,087 acres in four wilderness study areas (Black Ridge Canyons, Black Ridge Canyons West, Dominguez Canyon and Sewemup Mesa) would be recommended as preliminarily suitable for wilderness designation. Some wilderness boundaries would be expanded to improve manageability.

One hundred fifty-five tracts, totaling 27,956 acres, would be identified for disposal. Primary emphasis for disposal would be on exchange, and secondary emphasis would be on sales. Eight tracts, totaling 1,889 acres, would be identified for acquisition.

Easements on 65 miles of roads and 6.75 miles of trails would be acquired for a variety of resource management needs.

Three zones would be identified to guide the development of utilities: suitable for development (480,799 acres), sensitive to development (531,524 acres), and unsuitable for development (267,737 acres). Eight utility corridors totaling 67,580 acres would be designated for specific uses. The use of existing routes would be encouraged.

Fire on public land would be managed as directed by five fire response levels: critical (18,950 acres), full (976,790 acres), limited (108,233 acres), prescribed (27,000 acres), and wilderness (149,087 acres). These levels support the objectives of other resource programs.

CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

This document consists of both a resource management plan (RMP) and a draft environmental impact statement (DEIS). The RMP has been prepared in accordance with the Bureau of Land Management's (BLM's) planning regulations *43 CFR 1600*. The DEIS has been prepared in accordance with the Council on Environmental Quality's regulations for implementing the *National Environmental Policy Act* (NEPA) of 1969, 40 CFR 1500.

PURPOSE AND NEED

The Grand Junction Resource Management Plan (RMP) has been prepared for one fundamental purpose: to provide an overall framework (a master plan) for managing and allocating public land resources within the Grand Junction Resource Area over the next 15 to 20 years. This framework determines which resources will be given management emphasis in various parts of the resource area. In addition to providing a master plan for the Grand Junction Resource Area, this RMP also meets several specific objectives. It (1) identifies the areas in the Grand Junction Resource Area that are suitable for further coal leasing consideration, (2) analyzes the wilderness suitability of seven wilderness study areas (WSAs) located wholly or partially within the Grand Junction Resource Area, (3) identifies public land open, closed, or limited to vehicle use, (4) identifies public land that would be available for potential sale or exchange to consolidate ownership for improved management, and (5) analyzes the conflict between development of existing oil and gas leases with development rights and wilderness preservation of two wilderness study areas.

Management of public land resources is currently guided by five planning documents and one EIS prepared in the early or mid-1970s. The previous planning documents were prepared in a variety of formats and had varying levels of detail. Two of the documents were prepared to address single issues. These old documents did not adequately address many resource problems that are of concern today.

LOCATION OF THE PLANNING AREA

This RMP was prepared for the Grand Junction Planning Area. The planning area boundary covers most of the Grand Junction Resource Area. The planning area boundary excludes the national forest land on the eastern and southern boundary of the Grand Junction Resource Area. The planning area, resource area, and district boundaries are shown on maps in the map pockets located in the back of this document.

Portions of the Montrose and Moab Districts were included in this resource management plan because three wilderness study areas extend into these districts and several livestock grazing allotments in the Moab District are administered by the Grand Junction Resource Area. These areas, totaling approximately 108,703 acres, were included for wilderness and/or livestock grazing management only.

The Grand Junction Resource Area is located in the extreme west-central portion of Colorado. It is bounded on the north by BLM's Craig District, on the south by BLM's Montrose District, on the west by the Colorado-Utah state line, and on the east by the Glenwood Springs Resource Area. The city of Grand Junction is roughly in the center of the resource area.

The Grand Junction Resource Area is responsible for administering 1,459,391 acres of federal minerals that underlie both the public land (1,280,060 acres) and some private land (179,331 acres) within the planning area boundary. The general location of the Grand Junction Resource Area is shown on Figure 1-1. The Grand Junction Planning Area encompasses approximately 2,021,775 acres of public, private, national forest, national park, and state lands (see Table 1-1). Of this, approximately 1,280,060 acres are public land administered by the Bureau of Land Management.

GRAND JUNCTION PLANNING AREA

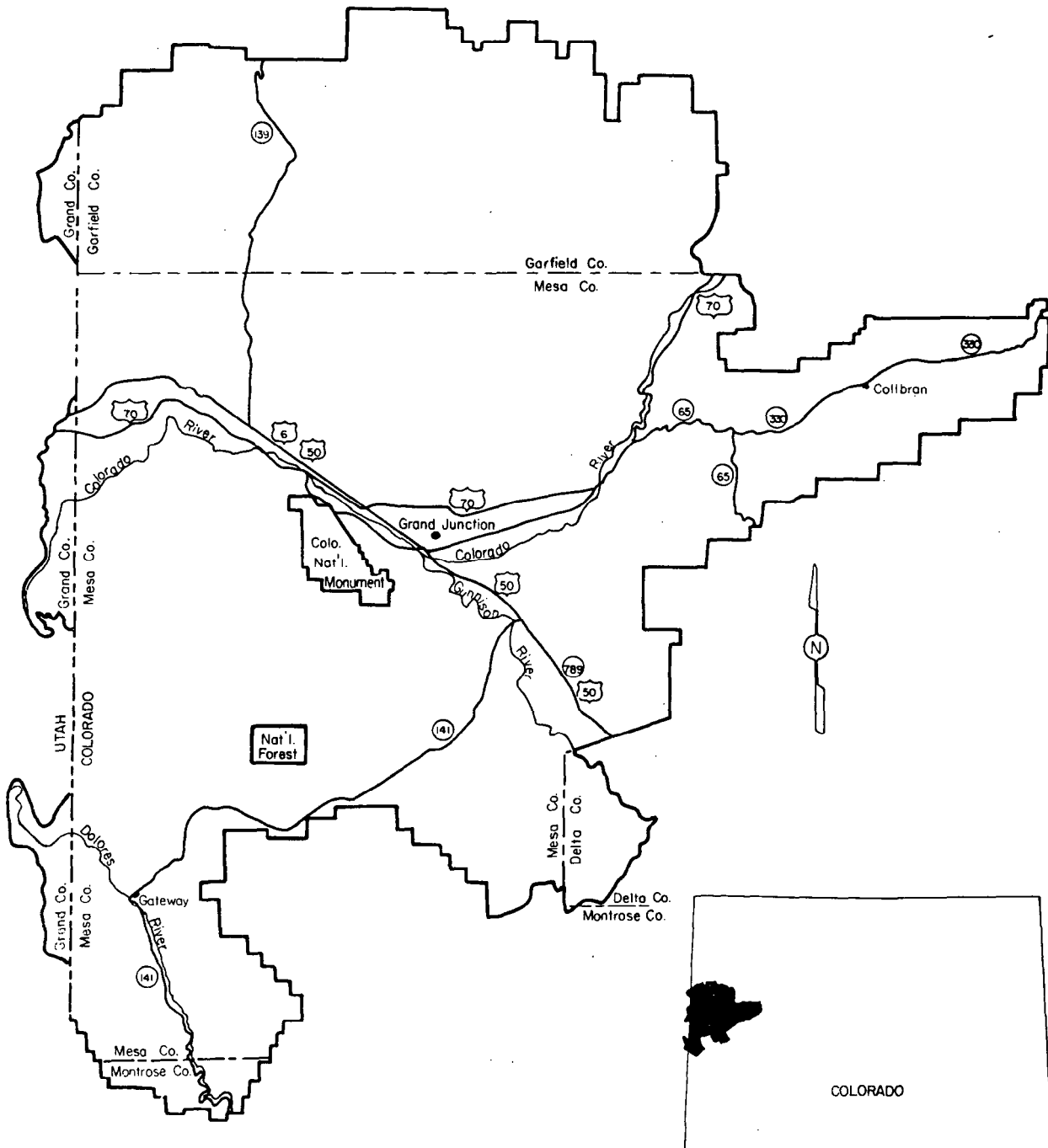


FIGURE 1-1

Issues Addressed

Table 1-1. Land Ownership in the Grand Junction Planning Area

Ownership	County				Total
	Delta	Garfield	Mesa	Montrose	
Public Land (Administered by BLM)	1,335	334,236	927,619	16,870	1,280,060
National Park Land (Colorado National Monument).....	0	0	20,445	0	20,445
National Forest Land (Fruita Reserve).....	0	0	7,680	0	7,680
State Land (DOW, Parks, State Land Board).....	0	0	5,635	0	5,635
Private Land ¹	305	157,546	548,744	1,360	707,955
Total	1,640	491,782	1,510,123	18,230	2,021,775

Note: This table does not include 108,703 acres in Montrose and Moab Districts that are being analyzed for livestock grazing or wilderness only.

¹This includes about 179,331 acres of private surface with some reserved federal minerals.

ISSUES

At the beginning of the planning process, the BLM, the general public, other federal agencies, and state and local governments identified issues and management concerns in the planning area. These issues were then screened to determine which issues would or would not be considered in the resource management plan (RMP). Both Issues Considered and Issues not Considered are presented in this section. Also presented is a discussion of Issues Previously Addressed.

ISSUES ADDRESSED

Air Quality Management

Impacts of various management actions on air quality.

Water Resource Management

Management of water flowing onto, from, and under the public land, especially regarding quality (sediment, salinity, etc.) and quantity.

Minerals Management

Suitability of public land within the Grand Junction Resource Area for coal leasing and development. Availability of mineral resources for exploration and development.

Paleontological Resource Management

Identification and protection of paleontological resources on public land.

Forestry

Management of commercial forest land and productive woodland in a sustained yield manner.

Wildlife Management

Management and protection of riparian areas. Protection of threatened, endangered, and sensitive species. Management and protection of game ranges. Consideration of nongame habitat.

Livestock Grazing and Wild Horse management

Compatibility of the Little Book Cliffs Wild Horse Range and mineral production. Categorization of allotments using the new I (improve), M (maintain), and C (custodial) system.

Cultural Resource Management

Management of unique cultural resources and special designations of public land for cultural resources.

Recreation Management

Designation of public land as open, closed, or limited for ORV use. Identification of public land needing special recreation management emphasis.

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Wilderness Management

Suitability of wilderness study areas to be recommended to Congress for inclusion in the National Wilderness Preservation System.

Land Tenure Management

Identification of land for disposal or acquisition to improve management effectiveness. Identification of land suitable for county landfill sites.

Social and Economic Conditions

Evaluation of significant social and economic impacts of program recommendations.

Transportation

Maintenance of existing legal and physical access and acquisition of new access to public land where resource values demonstrate the need.

Public Utilities

Protection and reclamation of resources during and following surface-disturbing activities. Identification of areas where utility corridors should not be allowed.

Fire Management

Management of wildfire to protect lives and property and enhance resource management.

ISSUES NOT ADDRESSED

Numerous concerns were identified that could not be appropriately addressed in the RMP. Many of these concerns will or are being addressed in other EISs or are issues that cannot be resolved in the RMP. Following are some examples of issues not addressed in the RMP.

The Colorado-Ute Southwest Project.

Disposal of spent oil shale.

Issuance of rights-of-way in a reasonable time.

Multiple leasing of rights-of-way.

Operation Game Thief type programs to protect archaeological sites.

Law enforcement.

Requiring lessees to permit public access across their private property or across easements they obtain.

Dominguez Dam.

The establishment of the proposed Rifle Resource Area.

Expansion of the Colorado National Monument.

Methods of land disposal.

Use of poisons to control predators.

Designation of Ruby Canyon and the Dolores River under the *Wild and Scenic Rivers System*.

Studying the Gunnison River for possible inclusion in the *Wild and Scenic Rivers System*.

Provision of interpretive and educational materials.

Low level nuclear waste disposal.

Additional mineral leasing in wilderness study areas.

Funding for reintroduction of wildlife species.

Valuation of game species.

The above is only a partial listing of issues that were not addressed in the RMP. A complete listing and the reasons they were not addressed are available at the Grand Junction Resource Area Office.

ISSUES PREVIOUSLY ADDRESSED

In 1979, a grazing environmental statement was completed for the Grand Junction Resource Area. This environmental statement complied with the NEPA and court-ordered requirements (NRDC vs Morton) for preparation of site-specific analyses of grazing impacts on public land. The environmental statement analyzed the impacts of proposed grazing management and range improvement practices for all allotments in the resource area.

Subsequently, a range management program document was issued describing the range management program decided on as a result of the environmental statement and public input. In 1980, some 130 grazing decisions were issued which included an allotment management plan (AMP) for each allotment. The grazing decision referred to above established active preference, suspended preference, total preference, number of livestock, kind of livestock, period of use, percent public land, and stocking rate by allotment. These decisions further identified objectives for each allotment. They also incorporated the AMP as a condition of the

Planning Criteria

grazing permit, identified the monitoring to be done, and stated that future changes in grazing would be based on land use plan decisions and the results of monitoring. This effort was completed in the summer of 1980.

As the direction for the grazing management program has been established, this RMP will not duplicate that effort. The allocations made, and the grazing decisions issued, will not be altered unless new issues arise in the RMP that were not addressed in the grazing environmental statement. Significant grazing-related issues or conflicts not addressed in the grazing environmental statement will be analyzed and considered in the decision making process. If this analysis and the resulting multiple use decision require a change in the grazing program, new grazing decisions will be issued following completion of the record of decision document for the RMP, and appropriate changes in grazing use will be instituted.

Reductions in anticipated funding have resulted in the implementation effort being several years behind schedule. To date, 56 AMPs have been fully or partially implemented.

In 1978-79, allotments were classified as I (those to be intensively managed) and C (those to be less intensively managed). In 1982, BLM adopted an allotment categorization policy. This policy required each allotment to be analyzed and placed in one of the three categories: I, improve the current resource condition; M, maintain the present resource condition; and C, custodially manage the existing resource values. This process allows allotments to be placed according to similar rangeland resource characteristics, which helps to identify needed management actions and intensity. It also helps to establish priorities for distributing available funds and personnel to achieve cost effective improvement of the rangeland resources. Criteria used in the categorization and the purpose and effect of the categorization are displayed in Chapter 1, Planning Criteria.

Some range improvements originally proposed in various allotments proved unfeasible based on engineering or economics when the time came to actually do the work. Accordingly, in many cases, proposed projects were dropped or replaced by a different improvement or moved to another location. Appendix G shows the present status of all allotments including the new categorization and identifies changes made in public areas since 1979 in season of use and stocking rates.

Livestock management on portions of the Grand Junction Resource Area are managed under cooperative agreement by the Grand Resource Area, Utah, and were addressed in the Grand Resource Management Plan.

PLANNING CRITERIA

The issues listed previously in Issues Addressed were reworded into planning questions. Planning criteria were then developed to provide a framework for responding to the planning questions and issues. The planning criteria were used to guide inventories, to establish limits for proposed resource uses or levels of production, and to develop alternatives and select the Preferred Alternative.

Planning criteria may be legal, policy, or regulatory constraints that direct or limit BLM's ability to resolve issues, or they may respond to public input or coordination efforts with state and local governments and other federal agencies.

AIR QUALITY MANAGEMENT

How will the *Clean Air Act*, air quality classifications, and other federal and state air quality legislation affect resource management?

A. Identify federal and state air quality standards for the study area.

B. Ensure that management practices minimize impacts to air quality and comply with existing standards and regulations.

WATER RESOURCE MANAGEMENT

1. Which public land should be managed as critical watersheds—

A. Limit developments within 100-year flood plains.

B. Provide protection to community watersheds.

2. Which public land should be managed to maintain or improve water quality (including salinity)?

A. Comply with the standards identified in the 208 Plan and Colorado State Water Quality Standards.

B. Classify the waters in the resource area according to their quality and trend for human consumption, aquatic life/wildlife, irrigation, recreation, and livestock.

C. Identify sources of highly saline water.

D. Identify areas of high erosion which contribute to high sediment loads.

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E. Develop procedures to improve the quality of waters not meeting minimum legal standards.

SOILS MANAGEMENT

Where are the areas of active and potential soil erosion hazards?

A. Identify soil erosion areas which constitute a threat to human life and property.

B. Identify erosion potential for all soils and those soils that have good potential for improved production and erosion control through treatment.

OTHER LEASABLE MINERALS, LOCATABLE MINERALS, AND MINERAL MATERIALS MANAGEMENT

What other federal minerals should be made available for possible development through leasing, sale, free use, or location?

A. Provide opportunities for the development of sand and gravel, moss rock, and flagstone, as indicated by demand.

B. Limit the sale of mineral materials if they are readily available from private sources.

C. Give priority to meeting the mineral material needs of local governments.

D. Provide for development of uranium.

E. Identify areas where valuable resources must be protected from mineral development through segregation. Use lists of lands identified in Land Tenure Adjustment criteria as a partial screen.

F. Ensure adequate consideration is given to any mineral resources identified through mineral resource inventory.

COAL MANAGEMENT

What federal coal resources should be considered for future coal leasing?

A. Identify areas with resource development potential for coal development and consider only these areas in accordance with *43 CFR 3420.1-1*.

B. Apply the 20 unsuitability criteria to the areas of resource development potential where sufficient information exists.

C. Provide for a sufficient amount of leasing potential to stabilize existing industry within the area.

OIL AND GAS MANAGEMENT

What federal lands should be made available for possible oil and gas development through leasing?

A. Coordinate with the oil and gas industry to identify mineral potential.

B. Assess the acceptability of oil and gas leasing through the spectrum of no leasing to leasing with special stipulations.

C. Compare analysis of accessibility to resource potential.

D. Compare the public value of leasing against the use of lands for other purposes and the value of other resources which might be damaged or destroyed.

PALEONTOLOGICAL RESOURCE MANAGEMENT

Which areas should be managed for the protection and preservation of paleontological resources?

A. Classify paleontological resources into one of four appropriate categories as defined by policy.

B. Provide protection and/or interpretation of particularly significant paleontological areas through management as a research natural area, outstanding natural area, area of critical environmental concern or state natural area.

FOREST MANAGEMENT

1. Which public land should be managed as productive forest land and woodland?

Identify all public land suitable and available for sustained timber production based upon supply/demand, management needs, stand location (access, topography, ownership pattern, etc.), site potential, stand conditions, and other resource values.

2. What harvest levels and techniques are appropriate for those lands identified as suitable and available for sustained timber production?

A. Identify cutting practices based upon an examination of stand conditions, silvicultural treatments available, and the environmental conditions present within the constraints of multiple use.

B. Identify the harvest level that is technically, economically, and environmentally sound within the constraints of multiple use.

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WILDLIFE MANAGEMENT

1. How will aquatic and riparian habitats be managed to comply with laws, executive orders, and expressed public desire?

A. Identify aquatic and riparian resources.

1. Locate the streams, ponds, and reservoirs that have a fisheries potential and describe the present conditions.

2. Locate existing wetland and riparian habitats and describe the plant and animal characteristics, including the assessed condition of the habitats.

B. Develop a management strategy for aquatic and riparian resources.

1. List aquatic and riparian habitat improvement options and prioritize kinds of improvements, project sites, and action procedures.

2. Develop management guidelines that consider tolerance for the development of resources within aquatic/riparian areas.

2. How will wildlife habitats be managed to complement the work of the State Division of Wildlife?

A. Cooperate with the DOW to define areas where minerals exploration, rights-of-way processes, and other concentrated human activities could significantly affect big game and other localized species of wildlife.

B. Establish management guidelines to reduce or eliminate disturbances to those areas defined as sensitive to disturbance.

C. Identify the need for habitat management plans in a prioritized sequence. Incorporate requirements for aquatic/riparian areas and threatened, endangered, and sensitive species into these plans.

D. Sample mapped vegetation types throughout the resource area for game and nongame species. This will be the basic search for management opportunities, species useful as indicators of general habitat conditions, effects of land treatments, and estimations of relative habitat values.

3. What actions will be taken to comply with the state and federal endangered species acts?

A. Inventory and monitor sensitive plant and animal species and those listed as threatened and endangered by state and federal governments. Prioritize the inventory and monitoring of these species on the basis of legal status, local threats, and chance of finding usable data.

B. Coordinate with appropriate state and federal agencies. Assist, where appropriate, state and federal initiatives to raise threatened or endangered

species out of threat or endangerment, such as in reintroductions on public land.

C. Improve habitats of threatened, endangered, and sensitive species where possible.

1. Coordinate with interested users of public land.

2. Incorporate threatened, endangered, and sensitive species requirements into habitat management plans.

LIVESTOCK GRAZING MANAGEMENT

1. Which allotments should be categorized as improvement, maintenance, or custodial?

A. Be consistent with the grazing environmental impact statement. Any deviations must be clarified and justified.

B. Rely on the categorization in the existing grazing environmental impact statement to the extent possible.

C. Standards for the three categories are as follows:

I—Improve Category Criteria

Present range condition is unsatisfactory.

Allotments have moderate to high resource production potential and are producing at low to moderate levels.

Serious resource-use conflicts/controversy exist.

Opportunities exist for positive economic return from public investments.

Present management appears unsatisfactory.

Other criteria appropriate to EIS area.

M—Maintain Category Criteria

Present range condition is satisfactory.

Allotments have moderate or high resource production potential, and are producing near their potential (or trend is moving in that direction).

No serious resource-use conflicts/controversy exist.

Opportunities may exist for positive economic return from public investments.

Present management appears satisfactory.

Other criteria appropriate to EIS area.

C—Custodial Category Criteria

Present range condition is not a factor.

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Allotments have low resource production potential, and are producing near their potential.

Limited resource-use conflicts/controversy may exist.

Opportunities for positive economic return on public investment do not exist or are constrained by technological or economic factors.

Present management appears satisfactory or is the only logical practice under existing resource conditions.

Other criteria appropriate to EIS area.

D. Reduce user conflicts, particularly in the Grand Valley area, by segregating incompatible uses.

E. Provide appropriate visitor services and information such as brochures, a recreation user guide, and visitor assistance based on public demand and recreation management priorities.

F. Assess the future demands for recreation within the area.

OFF-ROAD VEHICLE (ORV) MANAGEMENT

Which public land should be designated as open, closed, or limited to ORV use?

A. Areas that have no user or resource conflicts will be designated as open.

B. Coordinate ORV designations with the transportation system.

C. Ensure designations consider adjacent U.S. Forest Service, National Park Service, and county designations.

D. Provide for intensive ORV use areas and special events by identifying suitable areas.

E. Provide protection to sensitive areas and resources such as scenic areas; threatened, endangered, or sensitive species; fragile soils; critical watersheds; critical wildlife areas; cultural and paleontological resources; areas designated for the protection of their natural values; and wilderness study areas.

F. Reduce conflicts between ORV users and other recreationists to an acceptable level of safety.

G. Reduce noise and dust problems adjacent to residential areas.

WILD HORSE MANAGEMENT

What actions can be taken to reduce or eliminate conflicts between wild horse management and oil and gas development in the Little Book Cliffs Wild Horse Area?

A. Work with the oil and gas industry to identify possible alternative levels of development.

B. Retain the goals in the existing wild horse management plan to the extent possible.

C. Recognize valid existing rights associated with the existing oil and gas leases.

CULTURAL RESOURCE MANAGEMENT

Which cultural resource sites or areas should be designated for protection and preservation?

A. Identify the most important cultural resource sites or areas. These sites/areas will be further categorized as high, moderate, or low priority.

B. Designate the most important sites or areas for special management.

RECREATION RESOURCE MANAGEMENT

What types and levels of recreation management and special designations are needed to provide suitable recreation opportunities?

A. Provide for a variety of recreational settings and opportunities.

B. Provide for management of intensive public use areas.

C. Provide for protection of special natural features desired by recreationists such as highly scenic areas and water-based recreation resources.

WILDERNESS MANAGEMENT

Which wilderness study areas (WSAs) should be recommended to Congress as suitable for designation as wilderness?

A. *Evaluation of wilderness values.* For each WSA consider the following:

1. The quality of the WSAs mandatory wilderness characteristics (size, naturalness, outstanding opportunities for solitude or primitive recreation).

Planning Criteria

2. The presence and quality of supplemental wilderness characteristics.

3. The benefits to other multiple resource values and uses which only wilderness designation could provide.

4. The extent to which wilderness designation would contribute to expanding the diversity of the National Wilderness Preservation System in terms of: (1) expanding the diversity of ecosystems and land forms, (2) providing opportunities for solitude or primitive recreation within a day's driving time (5 hours) of major population centers, and (3) balancing the geographic distribution of wilderness areas.

B. *Manageability*. Each WSA must be capable of being effectively managed to preserve its wilderness character.

C. *Quality Standards*. For each WSA, consider:

1. The effect on all identified or potential energy and mineral resource values.

2. The extent to which other resource values or uses would be foregone or adversely affected as a result of wilderness designation.

3. The alternative use if the area is not designated as wilderness, and the extent to which wilderness values would be foregone or adversely affected as a result of this use.

4. Comments received from interested and affected publics at all levels—local, state, regional, and national.

5. Adverse or favorable social and economic effects which designation would have on local areas.

6. The extent to which the recommendation is consistent with officially approved and adopted resource-related plans of other federal agencies and state and local governments.

D. Consider demands for additional wilderness based on ecosystem representation from the existing supply of areas under wilderness review in the Grand Junction Resource Area.

E. Consider impacts to WSAs from actions approved under the wilderness interim management policy.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (SPECIAL MANAGEMENT AREAS)

Which public land should be designated as areas of critical environmental concern (ACECs) and why?

A. Direct inventories in such a manner as to identify potential ACECs for cultural, scenic, soil, hydrology, geology, paleontology, fish and wildlife, and threatened, endangered, or sensitive species.

B. As appropriate, incorporate ACECs into the Colorado Natural Areas Program.

C. Areas identified as potential ACECs must meet the definition of ACECs as specified in 43 CFR 1610.7-2 and appropriate documentation provided.

LAND TENURE ADJUSTMENTS

1. Which lands should be retained, disposed of, or acquired to improve resource management?

A. Public land will be placed in one of the following categories:

1. *Category 1, Retention Areas*. Lands and mineral resources that will be retained under BLM administration for multiple use and will not be considered for sale. However, exchange proposals, boundary adjustments, and recreation and public purpose applications will be considered suitable for lands in the retention areas.

a. Public land to be considered for Category 1:

(1) Wilderness areas and wilderness study areas.

(2) National conservation areas.

(3) Wild and scenic rivers and wild and scenic study rivers.

(4) National or historic trails.

(5) Natural or research natural areas.

(6) Designated areas for cultural or natural history.

(7) Designated areas of critical environmental concern.

(8) Designated wild horse preserves.

(9) Other Congressionally designated areas.

(10) Threatened or endangered species habitat areas.

(11) Riparian habitat areas.

(12) Valuable recreation areas.

(13) Wetland areas as defined in *Executive Order 11990*, dated May 24, 1977.

(14) Flood plain areas (100-year) as defined in *Executive Order 11988*, dated May 24, 1977.

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(15) Large blocks of public land that are suitable for multiple use management.

(16) Lands containing water sources with valid existing water rights held by BLM (usually a 40-acre tract containing a spring).

(17) Critical big game winter range.

b. Public mineral resources to be considered in Category I:

(1) Coal potential development area.

(2) Known geologic structures (oil and gas).

(3) Areas identified to have nationally significant oil shale deposits.

(4) Lands known to contain economic deposits of locatable and salable minerals.

2. *Category II, Disposal Tracts.* Lands that will be considered for sale, transfer through exchange, R&PP, or boundary adjustment. In sales, the law requires the mineral estate be reserved to the government where there are known mineral values. Generally, the BLM will not acquire private land through exchange in the vicinity of disposal tracts.

a. Public land to be considered for Category II:

(1) Land proximate to cities, towns, or development areas.

(2) Isolated nonurban tracts so located as to make effective and efficient management impractical.

(3) Lands designated for agricultural, commercial, or industrial development as the highest use or otherwise most appropriate use.

b. Consider impacts to local governments.

c. Identify specific tracts for disposal.

d. Consider reserving public access in patent, where it would benefit the public.

3. *Category III, Further Study.* Lands and mineral resources that will require further study to determine whether they should be placed in Category I or Category II.

B. Consider acquisition of private land identified by the resource specialists as necessary to improve management of a particular resource. Give priority to exchange as the method of acquisition.

2. Which public land is suitable for lease or sale for recreation and public purposes to meet the needs of the state and local governments?

Coordinate with local governments to identify needs for recreation and public purposes (parks and landfills).

SOCIAL AND ECONOMIC CONDITIONS

What are the significant social and economic impacts of management actions recommended in plan alternatives?

A. Identify economic sectors most dependent on public land resources.

B. Determine, where possible, demographic, economic, and social effects of program recommendations.

TRANSPORTATION

1. Which areas of public land require administrative, legal, or physical access?

A. Identify vehicular and trail access needs.

B. Identify large blocks of public land lacking legal or physical access.

C. Identify areas having intensive use or high investment.

D. Determine areas requiring only administrative access.

2. What is needed to develop a transportation system?

A. Coordinate with program specialists to determine road needs over time.

B. Coordinate with local, state, and other federal agencies to assess their needs.

C. Identify potential roads needed for resource management.

D. Classify roads according to type of use; i.e., trunk line vs. feeder roads.

E. Close and rehabilitate unneeded roads for resource protection and public safety.

PUBLIC UTILITY MANAGEMENT

Which public land should be identified as sensitive to the placement of major utility systems?

A. Define sensitivity levels in terms of the presence or absence of critical resources. These may include threatened, endangered, or sensitive species; Class I or II VRM areas; hazards; wilderness study areas; highly significant cultural resource sites/areas; community expansion areas; etc. Sensitivity levels will be identified in three categories: suitable, sensitive, and unsuitable.

Planning Criteria

- B. Identify existing corridors and their capacity.
- C. Designate areas for corridor use, as appropriate.

FIRE MANAGEMENT

How should wildfires be managed to protect lives and property while enhancing resource management?

- A. Exclude wildfires from areas where they pose a threat to human life, property, and high resource values.
- B. Manage fires or initiate prescribed burns to maintain natural ecosystems or manipulate vegetative types.
- C. Identify areas where a limited suppression policy should be established.
- D. Comply with BLM policy to minimize air quality impacts from open burning particulates.

ibility (limits or restrictions that must be placed upon resources or uses to avoid conflict with the priority use), and the types of uses or activities that would be excluded from a specific priority use area.

- 7. Each must consider other agency and state and local government plans and policies.
- 8. Each must recognize prior existing rights.
- 9. Areas of Critical Environmental Concern (ACECs) will be identified in all alternatives except the No Action Alternative.
- 10. All potential alternatives must be screened to ensure they meet the above requirements. Similar alternatives will be combined in order to reduce the number of alternatives to a manageable number. Alternatives which do not meet the following standards will be eliminated: 1) consistent with existing laws and regulations; and 2) constrained by probable future funding levels, technology, and other appropriate factors.

CRITERIA FOR ALTERNATIVE FORMULATION

- 1. Each must be implementable and a complete land use plan itself.
- 2. Be responsive to the issues (each issue must be addressed in appropriate alternatives).
- 3. A range of alternatives from resource protection to resource production will be included.
- 4. Meet Bureau requirements for wilderness, coal, oil and gas, and ORV designations.
- 5. Each alternative should comply with the multiple-use and sustained yield principle for renewable resources.
- 6. Each alternative will incorporate the Priority Use Management concept. This includes identifying priority areas (areas where a specific resource will be given management emphasis), compat-

CRITERIA USED TO SELECT PREFERRED ALTERNATIVE

- 1. Resource allocations should reflect protection of unique and fragile resources.
- 2. Resource allocations should be responsive to issues and concerns of national importance.
- 3. Resource allocations should be responsive to concerns and needs expressed through public scoping.
- 4. Resource allocations should promote the stability, diversity, and growth of local and regional economies.
- 5. Resource allocations should be practical in terms of implementation and monitoring.
- 6. Resource allocations should be as compatible as practicable with other agencies' goals and objectives.

CHAPTER 2

ALTERNATIVES

CHAPTER 2

ALTERNATIVES

INTRODUCTION

Four alternative land use plans are being considered for management of the Grand Junction Planning Area—Continuation of Current Management Alternative (CCMA), Commodity Alternative (CA), Protection Alternative (ProA), and Preferred Alternative (PA).

Under the Continuation of Current Management Alternative, public land resources would continue to be managed much the same as they are now. Policies and decisions made in existing planning documents would continue to be implemented.

Under the Commodity Alternative, production of resources such as minerals and forest products would take priority over protection of resources such as wilderness and wild horses. In contrast, under the Protection Alternative, the management priority would be nearly reversed. Management of wilderness and wild horses would be given top priority whereas mineral and forest production would be given low priority.

Under the Preferred Alternative, resources would be managed to provide for both production and protection. Where production is proposed, the remaining resources would be protected as much as possible by placing special stipulations on mineral leasing, limiting off-road vehicle use, and designing timber sales to enhance wildlife objectives. Where protection is proposed, production would sometimes be allowed. However, more stringent measures would be taken to protect the sensitive resources.

This chapter describes management proposed under the four alternatives. It is composed of three major sections. The first section is a summary of the management actions by resource. The second section is a comparison of management actions by alternative, and the third section is a description of how resources would be managed in a particular geographical area, termed emphasis area. The management recommendations presented in the third section (emphasis area) are much more detailed than those prescribed in the first section (summaries).

Five maps, one for resource uses common to all alternatives and one for each alternative, are provided in map pockets at the end of this document.

The alternative maps are to be used with the third section, emphasis area narratives.

SUMMARY OF MANAGEMENT ACTIONS

Each alternative proposes a different management of the public land resources. The differences generally translate into acres of public land either available or unavailable for management of a resource or resource use and the stipulations or restrictions placed on such use.

The differences in acres available or unavailable for management of each resource are summarized in this section. This section also describes how the management actions proposed under each alternative would be implemented, support needed to implement the management proposals, and how they would or would not be consistent with other federal, state, and local land use plans. Finally, this section contains a brief discussion of the most important effects of implementing the management actions.

AIR QUALITY MANAGEMENT

Proposed Management Actions

Proposed management actions, implementations, and consistency would be the same under all alternatives. Existing air quality would be inventoried (cooperatively with other agencies) to establish a baseline from which changes associated with BLM or other agency proposals could be determined. Future impacts from BLM actions would be predicted prior to implementation. Proposed projects would comply with all applicable local, state, and federal regulations to limit air quality degradation.

Proposed projects would be designed so as not to further degrade existing air quality within the Grand Junction nonattainment area.

Implementation

Site-specific project plans for proposals affecting BLM and adjacent lands would be reviewed for

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compliance with existing laws and policies protecting these areas. Mitigation would be incorporated into project proposals to reduce air quality degradation.

Support

Technical support would be required from air quality specialists in the Colorado State Department of Health, Air Pollution Control Division; U.S. Environmental Protection Agency, Region VIII; the U.S. Forest Service, Region II; and the National Park Service, Rocky Mountain Region.

Consistency

These procedures are consistent with Colorado Department of Health Air Control Division and U.S. Environmental Protection Agency Region VIII goals for air quality management.

Effects

Deterioration of air quality would be limited as required by law.

SOILS MANAGEMENT

Proposed Management Actions

Under all alternatives, proposed surface-disturbing projects would be analyzed to determine suitability of soils to support or sustain such projects. Projects on suitable soils would be designed to minimize soil loss (Appendix C).

Three locations—Baxter/Douglas Pass, Cactus Park, and Plateau Creek—would receive special management consideration depending on the alternative (Table 2-1). In the Baxter/Douglas Pass area, 18,000 acres would be managed to exclude surface occupancy and limit surface disturbance. Approximately 860 acres with soil slump hazard in Plateau Creek area would have no surface occupancy allowed under the Preferred Alternative. The critically eroding soils and gullies in Cactus Park would be stabilized and protected through reseeding, gully plug installation, off-road vehicle limitations, and other erosion control methods. Table 2-1 shows the acres proposed for treatment under each alternative.

Steep slopes (those over 40 percent) throughout the resource area also have a high susceptibility to slumping and accelerated erosion when the surface is disturbed or deep cuts are made. No surface oc-

cupancy or disturbance would be allowed on these slopes under the Protection and Preferred Alternatives. Other surface-disturbing activities on these slopes would be allowed only after considering site-specific conditions and the degree of disturbance that could be expected.

Table 2-1. Soils Management Recommendations

Proposed Management Actions	(Acres)			
	CCMA	CA	ProA	PA
Treatment of Critically-Eroding Soils in Cactus Park.....	0	800	1,500	1,000
Protection of Soil Slump Hazard Area.....	18,000	0	18,000	18,860

Implementation

Prior to approval of surface-disturbing projects, soil suitability would be determined. Projects proposed on unsuitable soils might be denied, modified to mitigate soil imposed limitations, or moved to a suitable location. Soils stabilization in Cactus Park would be accomplished through limiting access and land treatment such as reseeding. Gullies would be plugged and other sediment and erosion control measures could be used to reduce concentrations of overland flow and gully cutting.

Support

Support would be needed from all resources to incorporate in management actions measures that reduce soil erosion and enhance soil productivity (Appendix C).

Consistency

Reducing soil erosion and sediment yield is consistent with improving water quality and long-term soil productivity and with long-term state and USDA Soil Conservation Service planning.

Effects

The proposed actions would decrease the hazard of soil failures to property and life and would reduce sediment yield and loss of soil productivity.

Summary of Management Actions

WATER RESOURCE MANAGEMENT

Proposed Management Actions

Under all alternatives, critically-eroding soils in selected locations would be treated to reduce sediment and salinity. Existing sediment and salinity control structures in Indian Wash and Leach Creek would be maintained. Several critically-eroding stream channels would be treated. Possible treatment techniques for water quality improvement are listed in Appendix B.

Under all alternatives, the Palisade municipal watershed would be protected from surface-disturbing

activities that could adversely affect water quality and quantity. The Grand Junction municipal watershed and Jerry Creek Reservoirs would be protected under the Preferred Alternative only.

Studies would continue in the Badger Wash hydrologic study area and the Sinbad Salinity Control Project under all alternatives.

The remaining public land would be managed to maintain or improve water quality under all alternatives. Table 2-2 summarizes water resource management action.

Table 2-2. Water Resources Management Recommendations

(In Acres Unless Otherwise Noted)

Proposed Management Action	Alternatives			
	CCMA	CA	ProA	PA
Sediment Reduction:				
a. Rough Canyon Area.....	0	8,500	8,500	8,500
b. Cactus Park.....	0	1,500	1,500	1,500
c. Upper Big Wash.....	0	1,500	1,500	1,500
d. South of South Shale Ridge and North of Sulphur Gulch.....	0	9,700	9,700	9,700
e. Northwest of Corcoran Wash.....	0	3,800	3,800	3,800
f. East of Lower Roan Creek.....	0	3,100	3,100	3,100
g. East of De Beque Cutoff Road.....	0	2,200	2,200	2,200
h. Grand Valley Desert.....	117,000	117,000	117,000	117,000
i. Snyder Canyon.....	0	900	900	900
j. Calamity and Blue Creeks.....	0	3,300	3,300	3,300
k. Dolores River Area.....	0	18,100	13,200	18,100
l. Little Dominguez Creek.....	0	2,400	0	0
m. Jerry Gulch and Coal Canyon.....	0	3,600	0	0
Total:	117,000	175,600	164,700	169,600
Salinity Reduction:				
a. Rough Canyon Area.....	0	3,700	3,700	3,700
b. Upper Big Wash.....	0	1,200	1,200	1,200
c. South of South Shale Ridge and North of Sulphur Gulch.....	0	6,500	6,500	6,500
d. East of Roan Creek.....	0	1,000	1,000	1,000
e. East of De Beque Cutoff Road.....	0	900	900	900
f. Grand Valley Desert.....	133,000	133,000	133,000	133,000
Total:	133,000	146,300	146,300	146,300
Sediment and Salinity Project Maintenance:				
a. Leach Creek.....	2,040	2,040	2,040	2,040
b. Indian Wash.....	4,020	4,020	4,020	4,020
Total:	6,060	6,060	6,060	6,060
Stream Channel Treatment (total miles)	27.3	63.3	58.1	63.3
Municipal Watershed Protection:				
a. Palisade Municipal Watershed.....	14,000	14,000	14,000	14,000
b. Grand Junction Municipal Watershed and Jerry Creek Reservoirs.....	0	0	0	1,760
Badger Wash Hydrologic Study Area	685	685	685	685
Sinbad Valley Salinity Project	50	50	50	50

Implementation

Under the Continuation of Current Management Alternative, projects including vegetation manipula-

tions, timber sales, and range improvements would be designed to minimize water quality degradation. Existing salinity and sediment reduction projects, including Sinbad Valley, would be continued resulting

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in enhanced quality of water. Site-specific analyses of sediment yield and other water quality species would be conducted for projects with potential for substantial water quality impacts. All projects would require development of activity plans.

Under the Commodity, Protection, and Preferred Alternatives, measures would be taken in selected critically-eroding and saline areas to reduce sediment and salinity yield. Activity plans would be written for each of these water quality problem areas. When feasible, water quality would be improved or maintained in all other areas by incorporating improvement measures into other resource program project designs. Site-specific analyses of water quality parameters would be done on projects with potential large scale water resource impacts.

Support

Sediment and salinity control structures would generally require the filing of a permit with the Colorado State Engineer under all alternatives. Structures constructed in perennial streams, or with a storage capacity of greater than 10 acre-feet, or dams with more than 15 feet in height would require a water right. Engineering support would be required for the survey, design, and construction of most projects benefiting water quality. Support would be needed from hydrology to implement off-road vehicle designations.

Consistency

The State of Colorado and the Colorado West Area Council of Governments' 208 Plan, which includes the Grand Junction Resource Area, establishes water quality standards by use by stream. The effects of management would be consistent with the 208 plan. Localized increases in salinity and/or sediment from range and wildlife vegetation manipulations and during timber and mineral activities could occur. This might result in a temporary violation of a recommended standard. The actions proposed to improve or maintain water quality have received favorable support from affected city and county governments.

Effects

Continuation of Current Management. Existing water quality would be maintained but would not improve except for within the Indian Wash and Leach Creek watersheds.

Commodity Alternative. Existing water quality would be improved in the long term by reducing sediment and salinity yields in 13 areas where critical erosion of saline and nonsaline soils is presently occurring (Table 2-2). Water quality would be maintained in the remainder of the resource area.

Protection Alternative. Existing water quality would be improved in the long term by reducing sediment and salinity yields in 11 areas of critically-eroding saline and nonsaline soils (Table 2-2). Water quality would be maintained in the remainder of the resource area.

Preferred Alternative. Existing water quality would be improved in the long term by reducing sediment and salinity yields from 11 areas (Table 2-2). Water quality would be maintained in the remaining portion of the resource area.

LOCATABLE MINERALS MANAGEMENT

Proposed Management Actions

Existing withdrawals would continue under all alternatives. Under the Continuation of Current Management Alternative, the Black Ridge recreation area would be withdrawn. Under the Commodity Alternative, there would be no additional withdrawals. Under the Protection Alternative, all seven areas recommended for wilderness designation, highly valued backcountry recreation areas, and most special management areas would be withdrawn from mineral entry. Under the Preferred Alternative, the three areas recommended for wilderness designation and Ruby Canyon would be withdrawn. Table 2-3 shows acres recommended for withdrawal under each alternative.

Table 2-3. Locatable Minerals Management Recommendations

(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	CA
Open to location.....	1,266,548	1,334,548	893,329	1,180,881
Closed to location:				
a. Existing withdrawals.....	124,843	124,843	124,843	124,443
b. Additional withdrawals.....	68,000	0	441,219	154,067

Summary of Management Actions

Table 2-3. Locatable Minerals Management Recommendations—Continued

(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	CA
1. Wilderness study areas				
a. Black Ridge Canyons	0	0	20,185	*73,937
b. Black Ridge Canyons West	0	0	55,015	
c. Sewemup Mesa	0	0	19,140	18,835
d. The Palisade	0	0	26,180	0
e. Little Book Cliffs	0	0	28,600	0
f. Demaree Canyon	0	0	24,500	0
g. Dominguez Canyon	0	0	78,935	56,315
2. Special management areas				
a. Transect 7	0	0	9,000	0
b. Indian Creek	0	0	350	0
c. Little Book Cliffs WHR	0	0	11,232	0
d. Unaweeep Seep	0	0	37	0
e. Badger Wash Uplands	0	0	1,230	0
f. Rabbit Valley	0	0	280	0
g. Black Ridge Angiosperm	0	0	0	0
h. Utility Corridor	0	0	0	860
i. Pyramid Rock	0	0	470	0
3. Highly valued recreation areas				
a. Mount Garfield	0	0	9,520	0
b. Recreation Sites	0	0	0	120
c. Gunnison Gravels	0	0	5	0
d. South Shale Ridge	0	0	22,500	0
e. Sinbad Valley	0	0	15,000	0
f. Ruby Canyon	0	0	10,000	4,000
g. Gunnison River	0	0	18,000	0
h. Dolores River	0	0	17,000	0
i. Granite Creek	0	0	15,000	0
j. Hunter/Garvey Canyons	0	0	19,000	0
k. Bang's Canyon	0	0	40,000	0
l. Black Ridge Recreation Area	68,000	0	0	0
Total	68,000	0	441,219	154,067
Total Existing and Additional Withdrawals	192,843	124,843	566,062	278,510

*Black Ridge Canyons and Black Ridge Canyons West WSAs would be combined under the Preferred Alternative.

Implementation

A formal withdrawal would be required to close any area to location under the general mining laws. The restrictions on location within the wilderness study areas would become effective only if these areas are designated wilderness by Congress. Pending this determination, the areas would be managed under the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* and 43 CFR 3802.

For those areas identified as open to location, BLM approval would not be required to prospect for minerals or locate mining claims on public land. However, prior to developing mining claims, the mining claimant must notify the local BLM office and the Colorado Mined Lands Reclamation Board of the proposed operations. Disturbance of 5 acres or less does not require approval of the notice; dis-

turbance of more than 5 acres requires a plan of operations for approval. Both the notice and plan submitted under 43 CFR 3809, *Surface Management of Public Lands under U.S. Mining Laws*. The Colorado Mined Lands Reclamation Board requires either a notice of intent to conduct prospecting or an application to mine.

Support

Support would be required from other resource specialists to review and provide input into approval of a plan of operations or for comments on a notice of intent. Support would also be required by the local BLM office in preparing formal withdrawal reports and by the Secretary of the Interior in approving the reports.

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Consistency

The local land use plans for Garfield and Mesa Counties state that mineral development should take place in an environmentally acceptable manner so as not to destroy the recreational and scenic values of the counties and that mineral activities should not destroy the ability of the land to be used for farming and ranching. The plan is consistent with the intent of those land use plans.

Effects

Closing additional acres to mineral location (see Table 2-3) would reduce by a like amount the number of acres available for exploration and development. These reductions could adversely affect the minerals industry in the long term if demands for these resources increase significantly. Additional closures would protect other valuable resources such as wilderness, recreation, municipal watersheds, recreational potential, and scenery.

COAL MANAGEMENT

Proposed Management Actions

Under all alternatives, three areas would be identified as unsuitable for further coal leasing consideration based upon coal unsuitability review. This includes the FAA site (40 acres) located within the Palisade municipal watershed, the Palisade municipal watershed (10,000 acres), and the Colorado River corridor (4,100 acres) in De Beque Canyon.

Under the Continuation of Current Management Alternative, the Little Book Cliffs Wild Horse Range would be eliminated from further coal leasing consideration based on multiple use tradeoffs. Under the Protection Alternative, two wilderness study areas recommended for wilderness designation and the Little Book Cliffs Wild Horse Range would be identified as unsuitable for further coal leasing consideration based on multiple use tradeoffs. This does not include 1,934 acres of pre-FLPMA coal leases in Little Book Cliffs WSA and 2,080 acres in Demaree Canyon WSA. Under the Commodity and Preferred Alternatives, no areas would be identified as unacceptable for further coal leasing consideration based upon multiple use tradeoffs except for the Little Book Cliffs Wild Horse Range. The Little Book Cliffs Wild Horse Range (24,421 acres) would be acceptable pending further study. This study would determine the effects of surface facilities in upper Coal Canyon on the viability of the horse herd. If the study showed that coal development would result in a nonviable herd, the adverse impacts would be mitigated by lease stipulation to ensure a viable horse herd is maintained. Table 2-4 summarizes coal management recommendations.

Table 2-4. Coal Management Recommendations

(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Acceptable for further coal leasing consideration.....	*325,968	*350,389	223,137	*350,389
Unacceptable for further coal leasing consideration: ^b				
a. Unsuitable based on coal unsuitability:				
1. Palisade municipal watershed.....	10,000	10,000	10,000	10,000
2. Colorado River corridor.....	4,100 _c	4,100 _c	4,100 _c	4,100 _c
3. FAA lease.....				
Total:.....	14,100	14,100	14,100	14,100
b. Unacceptable based on multiple use tradeoffs				
1. Little Book Cliffs WSA.....	0	0	26,666	0
2. Demaree Canyon WSA.....	0	0	22,420	0
3. Little Book Cliffs WHR.....	24,421	^d 0	0	^d 0
4. Little Book Cliffs WHR (outside WSA).....	0	0	9,066	0
5. Hunter/Garvey Canyons.....	0	0	19,000	0
6. Mount Garfield/Grand Mesa.....	0	0	9,520	0
7. South Shale Ridge.....	0	0	22,500	0
8. Baxter/Douglas Pass soil areas.....	0	0	18,000	0
9. The Goblins.....	0	0	80	0
Total:.....	24,421	0	127,252	0

*Includes 45,419 acres within two WSAs that would be unsuitable pending Congressional action on wilderness recommendations.

^bSee Appendix D.

^cIncluded in the Palisade municipal watershed acreage.

^dAcceptable pending further study.

Summary of Management Actions

Implementation

Areas identified as suitable for further consideration for coal leasing would go through additional steps before being offered for lease. First tracts would be identified, and an EIS would be prepared on those tracts. This process involves industry, the regional coal team (RCT), governmental agencies, and the public. Recommendations would be made to the Secretary of the Interior, based on the analysis of the coal tract through the activity plan stage. The Secretary of the Interior would make the final decision on regional sale schedule dates and tracts to be offered, if any, and leave stipulations on offered tracts.

Support

Cadastral surveys would be required to locate potential coal lease tracts in the Book Cliffs and Grand Mesa coal fields.

Consistency

The local land use plans for Garfield and Mesa Counties state that mineral development should take place in an environmentally acceptable manner as not to destroy the recreational and

scenic values and that mineral activities should not destroy the ability of the land to be used for farming and ranching. The plan is consistent with the intent of those land use plans.

Effects

Closing additional acres to further consideration for coal leasing (Table 2-4) would reduce by like amount the number of acres available for leasing. This reduction could adversely affect the coal industry in the long term if demands for coal increase significantly. However, other valuable resources would be protected.

OIL AND GAS MANAGEMENT

Proposed Management Actions

Leasing. Under all alternatives, the federal oil and gas estate within the resource area (1,459,391 acres) would be assigned to various leasing categories. Three categories would be used under the Continuation of Current Management Alternative, and two categories would be used under the Commodity, Protection, and Preferred Alternatives (Table 2-5).

Table 2-5. Proposed Leasing Categories

Category	Alternative ¹			
	CCMA	CA	ProA	PA
Open to leasing:				
a. Without stipulations.....	608,383	1,125,664	471,595	624,701
b. With stipulations				
1. No surface occupancy.....	43,439	9,842	307,044	131,340
2. Others.....	439,332	323,885	428,197	554,263
Total.....	1,091,154	1,459,391	1,206,836	1,309,951
Closed to leasing ²	111,838	0	252,555	149,087
Undesignated (case-by-case basis).....	256,399	0	0	0

¹These acreages include federal oil and gas estate on lands with both federal and privately controlled surface estate.

²Wilderness study areas are presently closed to leasing, pending Congressional action. This table shows proposed leasing categories following Congressional action.

All lands placed in the Open to Leasing category would be leased with standard lease terms. These lands would be leased either Without Stipulations (except for standard lease terms) or With Stipulations.

a. Lands placed in the Open for Leasing With Stipulations category contain sensitive resources. These lands would be leased either with a No Surface Occupancy Stipulation or with Other Stipulations.

b. Lands leased with a No Surface Occupancy stipulation contain sensitive resources that could be destroyed or severely degraded by oil and gas development. Other less restrictive stipulations would not adequately protect the sensitive resources in these areas.

c. Lands leased with Other Stipulations also contain sensitive resources. However, these areas could be adequately protected without prohibiting

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all surface use. A list of Other Stipulations is presented in Appendix E.

Lands placed in the Closed to Leasing category contain sensitive resources under the Continuation of Current Management Alternative and areas that would be designated as wilderness in the Protection and Preferred Alternatives.

Lands placed in the Undesignated category also contain sensitive resources where a decision has

not been made about the leasing category. These lands would be placed in a leasing category as lease proposals are received and analyzed.

The acreage within each lease category and subdivision would change depending on the restrictions placed on oil and gas leasing by other resources. Table 2-6 shows the restriction placed on oil and gas leasing by other resources that would be protected under each alternative.

Table 2-6. Oil and Gas Leasing Restriction Recommendations

(In Acres)

Resource Concern	CCMA					CA				ProA				PA			
	Undesignated	No Leasing	Stipulations			No Leasing	Stipulations			No Leasing	Stipulations			No Leasing	Stipulations		
			NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹
SOILS MANAGEMENT																	
Baxter/Douglas Pass soil slump.....	0	0	18,000	0		0	0	0		0	18,000	0	3	0	18,000	0	3
Cactus Park erosive soils	0	0	0	0		0	0	0		0	1,500	0		0	0		
Plateau Creek slump	0	0	0	0		0	0	0		0	0	0		0	860	0	
Steep slopes	0	0	0	0		0	0	0		0	0	200,000		0	200,000		
Subtotal	0	0	18,000	0		0	0	0		0	19,500	200,000		0	18,860	200,000	
WATER RESOURCES																	
Badger Wash hydrologic study area	0	0	685	0	7	0	685	0	6	0	685	0	6	0	685	0	6
Palisade municipal watershed.....	0	0	0	0		0	0	14,000		0	0	14,000		0	14,000		
Grand Junction municipal watershed	0	0	560	0		0	560	0		0	1,240	0		0	1,240		
Jerry Creek Reservoirs	0	0	0	0		0	0	0		0	0	0		0	1,160		
Perennial streams.....	0	0	0	6,145		0	0	0		0	0	6,145		7	6,145		
Indian Wash Dam	0	0	300	0		0	10	0		0	300	0		0	10		
Subtotal	0	0	1,545	6,145		0	1,255	14,000		0	2,225	20,145		0	1,925	21,315	
GEOLOGY/PALEONTOLOGY																	
Fruita Paleontological Site.....	0	280	0	0		0	280	0		0	280	0	8	0	280	0	8
Rabbit Valley paleontological site	0	0	0	0		0	0	0		0	280	0		0	280		
Gunnison Gravels	0	0	0	0		0	0	0		0	0	5		0	5		
Black Ridge angiosperm.....	0	0	0	0		0	0	0		0	(40)	0		0	0		
Subtotal	0	280	0	0		0	280	0		0	560	5		0	560	5	
WILDLIFE																	
Deer and elk winter range	0	0	0	238,820	12	0	0	13,500	12	0	0	238,820	12	0	0	238,820	12
Bighorn sheep range	0	0	0	0	4	0	0	26,800	9	0	0	2,560	9	0	0	6,200	9
Elk calving areas.....	0	0	0	7,139		0	0	1,920	4	0	0	7,139	4	0	0	7,139	4
Skipper's Island.....	0	160	0	0		0	160	0	0	160	0	0	160	0			
Rough Canyon	0	0	0	0		0	0	0	0	0	0	0	(1,470)	0			
Subtotal	0	160	0	245,959		0	160	42,220		0	160	248,519		0	160	252,159	

Summary of Management Actions

Table 2-6. Oil and Gas Leasing Restriction Recommendations—Continued

(In Acres)

Resource Concern	CCMA					CA				ProA				PA			
	Undesignated	No Leasing	Stipulations			No Leasing	Stipulations			No Leasing	Stipulations			No Leasing	Stipulations		
			NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹
THREATENED AND ENDANGERED SPECIES MANAGEMENT																	
Bald eagle concentration areas.....	0	0	0	37,305	15	0	0	37,305	15	0	0	37,305	15	0	0	37,305	15
Peregrine falcon habitat.....	0	0	0	30,875	15	0	0	30,875	15	0	0	30,875	15	0	0	30,875	15
Black-footed ferret.....	0	0	0	21,488	14	0	0	21,488	14	0	0	21,488	14	0	0	21,488	14
Spineless hedgehog cactus ...	0	0	0	59,052	13	0	0	59,052	13	0	0	59,052	13	0	0	59,052	13
Uinta Basin hookless cactus ...	0	0	0	131,503	13	0	0	131,503	13	0	0	131,503	13	0	0	131,503	13
Sensitive plant species.....	0	0	0	0		0	0	0		0	0	73,600	13	0	0	0	
<i>Cryptantha elata</i> site.....	0	0	0	0		0	3,700	0		0	3,700	0		0	0	0	
Badger Wash uplands.....	0	0	0	0		0	0	0		0	1,230	0		0	0	0	
Pyramid Rock.....	0	0	470	0		0	470	0		0	470	0		0	470	0	
Unaweep Seep.....	0	440	0	0		0	37	0		0	37	0		0	440	0	
Colorado cutthroat trout.....	0	0	0	0		0	0	100	14	0	0	100	14	0	0	100	14
Subtotal.....	0	440	470	280,223		0	4,207	280,323		0	5,437	353,923		0	910	280,323	
WILD HORSE MANAGEMENT																	
Wild horse range.....	0	27,881	0	0		0	0	0		0	11,232	0		0	0	30,261	2
Wild horse winter range.....	0	0	0	0		0	0	6,500	10	0	0	0		0	0	(6,500)	10
Wild horse foaling area.....	0	0	0	0		0		(6,500)	11	0	0	0		0	0	(6,500)	11
Subtotal.....	0	27,881	0	0		0		6,500		0	11,232	0		0	0	30,261	
VISUAL RESOURCE MANAGEMENT																	
Juanita Arch.....	0	0	0	0		0	0	0		0	40	0		0	40	0	
Rattlesnake Arches.....	0	0	0	0		0	0	0		0	(1,920)	0		0	0	0	
The Goblins.....	0	0	80	0		0	80	0		0	80	0		0	80	0	
Colorado River corridor.....	0	0	0	0		0	0	0		0	7,040	0		0	7,040	0	
Ruby Canyon.....	0	0	0	0		0	0	0		0	8,000	0		0	8,000	0	
Dolores River corridor.....	48,054	0	0	6,145	2	0	0	0		0	17,000	0		0	17,000	0	
Gunnison River corridor.....	9,600	0	0	0		0	0	0		0	18,000	0		0	8,960	9,040	2
South Shale Ridge.....	27,985	0	2,560	0		0	0	0		0	22,500	0		0	0	22,500	2
Mount Garfield cliffs.....	0	0	3,398	0		0	0	0		0	9,520	0		0	9,520	0	
Grand Mesa slopes.....	0	0	0	0		0	0	0		0	9,600	0		0	9,600	(13,440)	2
Bang's Canyon.....	40,000	0	0	0		0	0	0		0	40,000	0		0	14,080	25,920	2
Sinbad Valley.....	14,560	0	0	0		0	0	0		0	15,000	0		0	1,920	(1,470)	2
Granite Creek.....	15,000	0	0	0		0	0	0		0	15,000	0		0	2,240	12,760	2
De Beque/Mount Logan.....	0	0	0	0		0	0	0		0	6,400	0		0	0	0	
Unaweep Canyon.....	0	0	0	0		0	0	0		0	40,000	0		0	14,080	6,400	2

Collbran Valley.....	0	0	0	0	0	0	0	0	16,000	0	0	0	0	
Hunter/Garvey Canyons.....	28,440	0	0	0	0	0	0	0	19,000	0	0	7,600	11,400	2
Vega Reservoir viewshed.....	0	0	0	0	0	0	0	0	0	0	0	0	120	2
Douglas Pass (Hwy. 139).....	0	0	0	0	0	0	0	0	10,800	0	0	(1,920)	19,200	2
Highway 50—Grand Junction to Delta.....	0	0	0	0	0	0	0	0	0	0	0	0	5,760	2
I-70—Grand Junction to station line.....	0	0	0	0	0	0	0	0	0	0	0	0	2,320	2
Black Ridge corridor.....	0	0	0	0	0	0	0	0	0	0	0	860	0	
Subtotal.....	183,639	0	6,038	6,145	0	80	0	0	253,980	0	0	101,020	121,420	
CULTURAL RESOURCE MANAGEMENT														
Indian Creek.....	0	0	0	0	0	0	0	0	350	0	0	350	0	
Rough Canyon.....	0	0	0	0	0	0	0	0	0	0	0	(1,000)	0	
Cactus Park.....	0	640	0	0	0	0	640	5	0	640	5	1,000	0	
Sieber Canyon.....	0	0	0	0	0	0	300	5	0	300	0	300	0	
McDonald Creek.....	0	0	0	0	0	0	160	5	0	160	0	160	0	
5ME1358.....	0	0	0	0	0	0	0	5	0	0	0	35	0	
Ladder Springs.....	0	0	0	0	0	0	640	5	0	640	0	640	0	
Transect 7.....	0	0	0	0	0	0	9,000	5	0	9,000	0	0	9,000	5
Subtotal.....	0	640	0	0	0	0	10,740	0	10,450	640	0	2,485	9,000	
RECREATION RESOURCE MANAGEMENT														
Black Ridge recreation lands.....	0	68,000	0	0	0	0	0	0	0	0	0	0	0	
Sewemup Mesa recreation lands.....	0	12,197	5,283	0	0	0	0	0	0	0	0	0	0	
Dominguez Canyon.....	72,760	0	8,040	0	0	0	0	0	0	0	0	0	0	
The Palisade ONA.....	0	0	2,803	0	0	0	0	0	0	0	0	1,920	0	
Developed recreation sites—BLM.....	0	0	160	0	0	160	0	0	160	0	0	160	0	
Island Acres recreation site² ..	0	80	0	0	0	80	0	0	80	0	0	80	0	
Vega Reservoir recreation site².....	0	2,160	0	0	0	2,160	0	0	2,160	0	0	2,160	0	
Highline Reservoir recreation site².....	0	0	1,100	0	0	1,100	0	0	1,100	0	0	1,100	0	
Unawep Overlook.....	0	0	0	0	0	0	0	0	0	5	8	0	0	
Subtotal.....	72,760	82,437	17,386	0	0	3,500	0	0	3,500	5	0	5,420	0	
WILDERNESS MANAGEMENT³														
Black Ridge Canyons.....	0	0	0	0	0	0	0	75,200	0	0	73,937	0	0	
Sewemup Mesa.....	0	0	0	0	0	0	0	19,140	0	0	18,835	0	0	
Dominguez Canyon.....	0	0	0	0	0	0	0	78,935	0	0	56,315	0	0	
Demaree Canyon.....	0	0	0	0	0	0	0	24,500	0	0	0	0	0	
Little Book Cliffs.....	0	0	0	0	0	0	0	28,600	0	0	0	0	0	
The Palisade.....	0	0	0	0	0	0	0	26,180	0	0	0	0	0	
Subtotal.....	0	0	0	0	0	0	0	252,555	0	0	0	0	0	
Gross Total.....	256,399	111,838	43,439	538,472	0	9,842	353,783	252,555	307,044	823,237	149,087	131,340	914,483	

Table 2-6. Oil and Gas Leasing Restriction Recommendations—Continued

(In Acres)

Resource Concern	CCMA					CA				ProA				PA			
	Undes-ignated	No Leasing	Stipulations			No Leasing	Stipulations			No Leasing	Stipulations			No Leasing	Stipulations		
			NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹		NSO	Others	Stip. No. ¹
Other Stipulations Estimated Overlap.....	0	0	0	—99,140		0	0	—29,298		0	0	—395,040		0	0	—360,220	
Adjusted Total	256,399	111,838	43,439	439,332		0	9,842	323,885		252,555	307,044	428,197		149,087	131,340	554,263	

Note: Parentheses indicate total overlap with another restriction.

¹See Appendix E for description of stipulations.²Most of this acreage is private surface, federal minerals.³Wilderness study areas are presently closed to leasing. This shows proposed leasing category following Congressional action on wilderness recommendations.

Summary of Management Actions

As shown in Table 2-6, some areas would receive the same protection under all alternatives. These include the Badger Wash study area, Fruita Paleontological Site, Skipper's Island, threatened and endangered species habitat, existing BLM developed recreation sites, and Highline Reservoir recreation site. The level of protection afforded is the minimum required to protect sensitive resources present or investments in facilities.

Under all alternatives, ten pending applications for permit to drill (APDs) on pre-FLPMA leases would be approved in the Little Book Cliffs area. This includes eight in the Little Book Cliffs WSA, one in the Little Book Cliffs Wild Horse Range, and one just outside both areas. (These ten pending APDs are discussed in Appendix E). Additional APDs on pre-FLPMA leases (14 are projected) would also be approved. Additional APDs on existing post-FLPMA leases (nine are projected) would be approved if they were found to be nonimpairing to wilderness suitability (see Oil and Gas Assumptions, Chapter 4).

Under all alternatives, APDs on pre-FLPMA leases (26 are projected) would be approved in Demaree Canyon WSA. APDs on existing post-FLPMA leases (7 are projected) would also be approved if they were found to be nonimpairing to wilderness suitability (see Oil and Gas Assumptions, Chapter 4).

Implementation

Leasing. Under all alternatives, the oil and gas leasing program would continue to be administered by the BLM Colorado State Office. Leasing forms would be filled out and sent to the Colorado State Office to direct future leasing. The leasing forms would show the leasing categories, with appropriate stipulations, for all lands in the resource area.

Under the Continuation of Current Management Alternative, lease applications for lands within the undesignated category would be sent to the resource area. The resource area would then determine which of the other leasing categories or subdivisions would be appropriate for those lands through an environmental assessment. Lease forms would then be completed and forwarded to the Colorado State Office where the lease application would be processed.

Development. Under all alternatives, applications for permit to drill (APDs) and sundry notices received would be processed according to the lease terms, except where stipulations not a part of the original lease but needed to protect sensitive resources (to the extent consistent with lease rights granted) would be added as an approval condition to APDs. Development of a well would typically

occur as shown in Appendix E, Section 1. Also added would be applicable standard design practices listed in Appendix C.

Support

Under all alternatives, support would be necessary from Cadastral Survey to locate public land boundaries.

Consistency

The Continuation of Current Management and Preferred Alternatives are generally consistent with the existing land use plans and policies of local municipalities, Garfield and Mesa Counties, the State of Colorado, and adjacent public and forest land management plans. In relationship to these plans and policies, the Commodity Alternative appears to place too much emphasis on oil and gas production at the expense of other resource values, and the Protection Alternative appears to overly restrict oil and gas leasing and development.

Effects

The major impacts on oil and gas resources would occur in areas with high oil and gas development potential under all alternatives. Therefore, the following discussion applies only to areas with high development potential. The management action with the greatest impact is assigning lands to the Closed to Leasing category. Closure of lands with high development potential would result in lost rental and royalty revenues and foregoing of oil and gas resources. Assigning lands to the Leasing with No Surface Occupancy stipulation category could also have high impacts. Drilling and development costs would be higher, as directional drilling would be necessary. Higher costs may result in limited activity and foregoing of some oil and gas resources. Leasing high development potential lands with other stipulations may result in slightly higher drilling and development costs and scheduling inconveniences, but would probably not result in foregoing oil and gas resources.

Under the Continuation of Current Management Alternative, approximately 30,121 acres with high development potential would be closed to leasing, 21,135 acres would be available for leasing with the no surface occupancy stipulation, 371,146 acres would be available for leasing with other stipulations, and 125,812 acres would be undesignated. These impacts would be relatively moderate. Under the Commodity Alternative, no lands with high development potential would be closed to

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leasing, 7,844 acres would be leased with the no surface occupancy stipulations, and 245,558 acres would be leased with other stipulations. These impacts would be relatively low. Under the Protection Alternative, approximately 53,100 acres with high development potential would be closed to leasing, 166,173 acres would be available for leasing with the no surface occupancy stipulation, and 337,500 acres would be available for leasing with other stipulations. These impacts would be relatively high. Under the Preferred Alternative, no lands with high development potential would be closed to leasing, approximately 63,100 acres would be available for leasing with the no surface occupancy stipulation, and 394,001 acres would be available for leasing with other stipulations. These impacts would be relatively moderate. All remaining high development

potential lands, under all alternatives, would be available for leasing with standard lease terms only.

MINERAL MATERIALS MANAGEMENT

Proposed Management Actions

Under all alternatives, areas currently closed to mineral material sales and free use permits would continue to be closed. Under the Preferred Alternative, areas that would be closed to mineral materials are similar to those areas that would be closed to oil and gas leasing or prohibited from surface occupancy. Table 2-7 shows the acres that would be open or closed to mineral materials.

Table 2-7. Mineral Materials Management Recommendations

(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Open to sales and free use permits	1,355,565	1,450,511	840,597	1,171,215
Existing closures.....	6,188	6,188	6,188	6,188
Additional closures:				
a. Badger Wash hydrologic study area	685	685	685	685
b. Palisade municipal watershed.....	0	0	14,000	0
c. Grand Junction municipal watershed	0	0	0	1,240
d. Jerry Creek	0	0	0	1,160
e. Baxter/Douglas Pass soils area	0	0	18,000	18,000
f. Plateau Creek slump	0	0	0	860
g. Rabbit Valley and Fruita paleontological sites.....	560	560	560	560
h. Elk calving area	0	0	400	400
i. Riparian area	0	0	6,145	0
j. Badger Wash uplands	0	0	1,230	0
k. Unaweep Seep.....	37	37	37	440
l. Pyramid Rock	470	255	470	470
m. Little Book Cliffs WHR	27,881	0	11,232	30,261
n. Cultural sites.....	0	1,150	11,360	2,485
o. Recreation sites and VRM areas.....	68,005	5	295,932	75,480
p. Wilderness study areas.....	0	0	252,555	149,087
q. Utility corridors	0	0	0	860
Total.....	103,826	8,880	618,794	288,176

Implementation

Mineral materials (moss rock, flagstone, sand and gravel, red gravel, etc.) would be available for purchase or free use. Although most disposals would occur from common use areas, permits would be issued for disposal outside of common use areas. Mineral reports and environmental assessments would be prepared on all permits issued outside of common use areas; a blanket environmental assessment would be prepared for all common use areas. Operations not in conflict with

environmental, social, or economic values would be encouraged.

Support

Support from the Division of Operations staff would be needed to open new common use areas.

Consistency

The local land use plans for Garfield and Mesa counties state that mineral development should

Summary of Management Actions

take place in an environmentally acceptable manner so as not to destroy the recreational and scenic values of the counties and that these activities should not destroy the ability of the land to be used for farming and ranching. The plan is consistent with the intent of those land use plans.

Effects

Closing additional acres to mineral materials sales (Table 2-7) would reduce by like amount the number of acres available for sale of mineral material. These reductions could adversely affect this industry in the long term if demands for these resources increase significantly. However, other valuable resources such as wilderness, recreation, municipal watersheds, recreational potential, and scenery would be protected.

PALEONTOLOGICAL RESOURCE MANAGEMENT

Proposed Management Actions

Under all alternatives, the Morrison and Wasatch Formations (433,760 acres) would be classified as Class I paleontological areas. The remainder of the resource area would be classified as either Class II or Class III.

Under all alternatives, the Fruita and Rabbit Valley paleontological sites would continue to be managed for scientific purposes. The Rabbit Valley site also would be managed for educational purposes.

Under the Protection and Preferred Alternatives, the Fruita and Rabbit Valley paleontological sites would be designated as research natural areas.

Implementation

Under all alternatives, surface surveys would be conducted in Class I areas prior to approving any surface-disturbing projects. Surface surveys would not be required prior to approving surface-disturbing projects in Class II and III areas. Any fossils found during surveys in Class I areas or during project implementation in all areas would be protected. Either the fossils would be removed or the project would be moved to another location.

Under all alternatives, the Fruita and Rabbit Valley paleontological sites plans would continue to be implemented.

Under the Protection and Preferred Alternatives, the Fruita and Rabbit Valley paleontological sites

would be recommended for research natural area designation, and the existing Fruita activity plan would be modified to reflect the designation.

Support

Support might be needed for construction of paths and placement of signs.

Consistency

The Garfield County Land Use Plan does not specifically address paleontological resources. However, the management approach of this plan is consistent with existing laws and policy and with the intent of the Mesa County Land Use Plan.

Effects

Inventory of project sites prior to project approval would continue to protect paleontological resources. Special management of the Fruita and Rabbit Valley sites would add to the existing scientific knowledge of paleontological resources.

FOREST MANAGEMENT

Proposed Management Actions

Under all alternatives, forest land would be identified as suitable or unsuitable for harvesting and management. All forest land would be protected from insects and disease. Practices that would be used in managing suitable forest lands are listed in Appendix B.

Under all alternatives, an annual allowable harvest for commercial forest land (Douglas-fir, spruce-fir, aspen, and ponderosa pine) would be established only after completion of a timber production capability classification (TPCC). Only under the Preferred Alternative would specific areas be identified for harvest and management.

Under all alternatives, poorly stocked pinyon-juniper woodlands and woodlands located on steep slopes would be identified as unsuitable for harvest. The annual allowable harvest of productive pinyon-juniper woodlands varies from a high of 3,200 cords per year under the Commodity Alternative to a low of 2,200 cords per year under the Protection Alternative. Under all alternatives, the annual allowable harvest has been reduced to account for trespass. This reduction is an estimate based upon field observation and public input. A study will be done at a

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later date to determine the exact amount of trespass, and the allowable harvest will be adjusted accordingly at that time. Under all alternatives except the Commodity Alternative, harvest and management of productive woodland would be designed to meet wildlife management objectives on big game winter ranges. Under the Preferred Alternative, harvest and management of productive woodland would be designed to be compatible with visual quality and recreational values in the Bang's

Canyon Intensive Recreation Management Area, Granite Creek, Sinbad Valley, South Shale Ridge, Hunter/Garvey Canyons, and The Palisade area by Gateway.

Table 2-8 shows the acres of commercial forest land (CFL) and pinyon-juniper woodlands identified as suitable or unsuitable for management under each alternative.

Table 2-8. Forest Management Recommendations

(In Acres Unless Otherwise Noted)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Commercial forest land unsuitable for management: ¹				
a. Poor stocking or steep slopes				
b. Adverse location				
c. Fragile soils				
d. Municipal watersheds.....	0	0	0	402
e. Recommended wilderness areas ²	0	0	546	434
f. Recreation areas	546	0	944	40
g. Recreation/wildlife areas.....	0	0	0	400
h. Pending completion of TPCC.....	38,559	39,105	37,615	36,510
Total	39,105	39,105	39,105	37,786
Commercial forest land suitable for management	0	0	0	1,319
Commercial forest land annual allowable harvest (MMBF)	0	0	0	0
Pinyon-juniper woodlands unsuitable for management:				
a. Poor stocking or steep slopes	401,400	401,400	401,400	401,400
b. Adverse location	3,881	7,097	3,881	4,738
c. Fragile soils	336	336	336	336
d. Municipal watersheds.....	0	0	0	955
e. Recommended wilderness areas ²	0	0	29,335	15,717
f. Recreation areas	21,417	15	12,466	40
g. Recreation/wildlife areas.....	0	0	0	1,654
h. Pending completion of TPCC.....	0	0	0	0
Total:	427,034	408,848	447,418	424,840
Pinyon-juniper woodlands suitable for management	109,050	127,236	88,666	111,244
Pinyon-juniper woodlands annual allowable harvest (cords)	3,900	4,800	3,300	4,200
Pinyon-juniper woodlands reduced annual allowable harvest (cords) ³	2,600	3,200	2,200	2,800

Note: Commercial forest land species represented: Douglas-fir, aspen, spruce-fir, and ponderosa pine. Woodland species represented: pinyon pine, Utah juniper, and Rocky Mountain juniper.

¹Based upon multiple use and TPCC restrictions. With completion of TPCC for CFL, revision in acreage and annual allowable harvest would be necessary. The majority of the CFL is in small, isolated stands on steep ground and is uneconomical to manage now or in the foreseeable future.

²These lands would be considered for multiple use management and return to the forest base if they were not designated wilderness.

³This harvest level for fuelwood reflects a reduction to compensate for trespass. This reduction is an estimated based upon field observation and public input. A study will be done at a later date to determine the exact amount of trespass, and the allowable harvest will be adjusted accordingly at that time.

Implementation

Management plans and/or environmental assessments would be prepared before the harvest of forest products under all alternatives.

Support

Cadastral surveying, Access, Transportation, and Rights-of-Way (ATROW), and engineering support would be needed for the design of management plans. Law enforcement would be needed to curtail the current trespass problem. Support would be needed from fire management to protect valuable timber resources.

Summary of Management Actions

Consistency

The harvest of forest products on a sustained yield basis is consistent with the plans of other federal and state agencies and is also consistent with current national policies and objectives.

Effects

The BLM would supply approximately one-third of the fuelwood market in the Grand Valley under all the alternatives based upon current market demands. The BLM would also supply a small amount of sawtimber under the Preferred Alternative. Stand productivity and yield would be expected to increase with the application of forest management practices under all alternatives.

public land in summer and 25,700 deer and 2,750 elk in winter would be provided forage and cover. Maintaining this big game use on the public land would depend upon the following: (1) Implementation of the *Grand Junction Grazing Management Environmental Statement*, (2) active wildlife management proposed in this resource management plan (Table 2-9), and (3) fully utilizing the range carrying capacity.

Under the Continuation of Current Management, Protection, and Preferred Alternatives, deer could increase to 15,500 (summer) and 34,400 (winter), and elk could increase to 870 (summer) and 2,950 (winter). This increase would come from the three sources above, from wildlife improvement projects, and from much greater protective management (Table 2-9) proposed under these alternatives.

WILDLIFE MANAGEMENT

Proposed Management Actions

Under the Commodity Alternative, the estimated existing population of 12,800 deer and 850 elk on

Table 2-9. Wildlife Management Recommendations

(In Acres Unless Otherwise Noted)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Active habitat management (key species management):				
a. Terrestrial Wildlife				
1. Deer and elk	761,043	1,101,755	731,697	1,011,859
2. Bear	259,846	273,830	260,830	273,830
3. Pronghorn	196,753	219,100	207,870	209,100
4. Bighorn sheep	30,990	30,990	2,560	6,200
5. Wild turkey and grouse	55,000	199,436	73,054	77,554
6. Waterfowl and desert gamebirds	150,253	209,100	207,870	209,100
b. Sport fisheries management				
1. Number of streams	22	23	22	22
2. Miles of stream	71	97	71	71
Protective habitat management:				
a. Deer and elk critical winter range and migration corridors	238,820	13,500	238,820	238,820
b. Elk calving area	7,139	1,920	7,139	7,139
c. Bighorn sheep range:				
1. Protected by special stipulations	15,851	26,800	2,560	6,200
2. Protected by wilderness or recreation designations	15,139	4,190	28,430	24,780
No surface disturbance (actual sites):				
a. Elk calving sites	0	100	500	500
b. Riparian area	6,145	140	6,145	6,145
c. Skipper's Island	160	160	160	0

Note: Above figures cannot be totalled because of overlap. The area dedicated to a key species would not necessarily be where habitat would be improved for that species. The acreage represents the area where that species' needs would have priority over the needs of other species (within the law). Among alternatives, acres identified for active management correspond positively with the level of habitat threats and negatively with the amount of area having limitations on habitat developments. See Appendix F.

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Under all alternatives, habitat of the major wildlife species would be actively managed using standard management practices listed in Appendix B. The number of acres actively managed for a key species would change under each alternative (Table 2-9). The priorities for management would also change under each alternative (Appendix F).

A total of 71 miles of trout stream would be managed for sport fisheries under all alternatives except the Commodity Alternative where 97 miles of streams would be managed as sport fisheries. Table 2-9 shows the acres of wildlife habitat that would be actively managed or receive protective management and the miles of streams that would be managed as sport fisheries under all alternatives.

The active management of nongame species would focus on the unique, sensitive, and endangered species discussed in the following subsection. Habitat protection would be of a general nature targeted for whole groups of species. The Protection and Preferred Alternatives would have snag retention considerations in addition to protection for game and riparian habitat that would embrace advantages to nongame also.

Under all alternatives, critical deer, elk, and bighorn sheep habitat would be protected by placing stipulations on development (Table 2-9). Also, no surface disturbance by any activity would be allowed in specific areas to prevent loss of breeding areas or special habitat. Timber sales would be designed to enhance wildlife habitat.

Under all alternatives, land would be made available to the Colorado Division of Wildlife for reintroduction of various wildlife species. Also wildlife habitats would be identified for active or protective management of a primary wildlife species.

Implementation

Under all alternatives, habitat management plans outlining specific management would be written for specific portions of the resource area. Priorities for implementing management recommendations through development of habitat management plans (HMPs) would change under all alternatives (see Appendix F). Management practices to improve wildlife distributions or available forage would be specifically defined in HMPs under all alternatives. The type of habitat improvements that would be made are listed in Appendix B. Monitoring effectiveness would be a part of each project, and the overall progress of the plans would rely on cooperation with the Colorado Division of Wildlife.

Support

Under all alternatives, big game habitat would be managed by the BLM in consultation with the Colorado Division of Wildlife which has responsibility for species management. Harvest levels have a direct impact on habitat condition.

Habitat management plans, which include habitat condition goals, habitat improvement projects indicator species and wildlife reintroduction, would require the participation of the Colorado Division of Wildlife and occasionally the U.S. Forest Service and the U.S. Fish and Wildlife Service under all alternatives. Assistance from range, forest, soil and cultural resource management would be required for project design. Engineering and fire management support would be required in both project design and implementation of many projects.

Under all but the Commodity Alternative, assistance from the Colorado Natural Areas Program would be needed to prepare habitat management plans for special management areas.

Consistency

The Continuation of Current Management, Protection and Preferred Alternatives contain adequate measures to allow big game populations to meet Colorado Division of Wildlife goals for 1988-1990. The Commodity Alternative would drop seasonal protection measures now in force.

Effects

Under all alternatives, habitat improvement projects for deer and elk would account for approximately one-third of the 14 percent increase in forage predicted in three of the four alternatives. These projects would help to compensate for habitat quality deficits present in the Commodity Alternative. The Commodity Alternative would not meet Colorado Division of Wildlife population goals primarily due to the absence of protective stipulations. Prioritization of habitat management plan implementation would partially offset this deficit through prioritization of wildlife projects in areas of development activity.

The Protection Alternative would include the most innovative and least tested habitat improvement projects. Nongame species would be given management priority over more economically attractive species in many cases. Small game populations would also receive management priority.

The Preferred Alternative would combine many of the protective aspects of the Protection Alternative

Summary of Management Actions

with the habitat management philosophy of the Commodity Alternative. Big game population increases would be supported through improved habitat conditions. Habitats of every native species would be adequately maintained to protect these species. Big game populations would increase although the ultimate potential would decrease. Public land administered by the BLM would accommodate an increasing percentage of big game populations.

THREATENED AND ENDANGERED SPECIES MANAGEMENT

Proposed Management Actions

Under all alternatives, habitat of unique, sensitive, and endangered plants and animals would be identified for active management and protection (Table 2-10). This level of management or protection would vary only in the Protection Alternative. Under the Protection and Preferred Alternatives, some protection would be provided through potential wilderness designation.

Under all alternatives, areas would be made available to the U.S. Fish and Wildlife Service and the Colorado Division of Wildlife for the reintroduction or management of peregrine falcons, summering bald eagles, the four Colorado River endemic fishes, and black-footed ferrets.

Unaweep Seep would be designated as a special management area under all alternatives (see Special Management Areas, this chapter). Pyramid Rock would receive a similar designation under the Continuation of Current Management, Protection, and Preferred Alternatives.

Implementation

Protection of habitat for state and federally listed threatened or endangered species is required in all BLM environmental documents where that habitat could be affected. Under all alternatives better documentation of that habitat would be available.

Habitat management plans would be prepared in consultation with the Colorado Division of Wildlife, Colorado Department of Natural Resources, and U.S. Fish and Wildlife Service, as appropriate. Under all alternatives, these habitat management plans (HMPs) would consider both listed and sensitive species as key management species. The HMPs would include habitat condition goals, habitat management projects, species reintroduction and monitoring that were appropriate for these species.

Support

Under all alternatives, assistance from the Colorado Division of Wildlife, Colorado Department of Natural Resources, and U.S. Fish and Wildlife Service would be needed for baseline data, objective formulation, project design, and monitoring in the preparation and implementation of habitat management plans and off-road vehicle designations where those plans address listed species. All the program support needed in the wildlife management program would also be required for threatened and endangered species management.

Consistency

Under all alternatives, the BLM would cooperate with the Colorado Division of Wildlife, Colorado Department of Natural Resources, and the U.S. Fish and Wildlife Service in habitat management planning for threatened and endangered species management to meet their goals. Recovery plans for the bald eagle and bonytail chub have been approved. Recovery plans for the Uinta Basin hookless cactus and the spineless hedgehog cactus are in draft form. Recovery plans for other threatened and endangered species are presently being revised. To the best of our knowledge, all alternatives would assist the Colorado Division of Wildlife and U.S. Fish and Wildlife Service in meeting their goals.

Under all alternatives, information included in approved recovery plans would be incorporated into BLM prepared wildlife management plans.

Effects

Under all alternatives, overall habitat area for threatened and endangered species would continue to decrease as a result of accommodating increasing numbers of public land users and increasing human pressure on adjacent lands. Significant local gains would be likely in the reintroduction programs and protection of these species is afforded under all alternatives. The Protection and Preferred Alternatives provide for the greatest number of reintroduction projects and protective measures. The Commodity Alternative would provide the least protection. All alternatives would comply with existing laws and regulations.

Failure to maintain threatened and endangered species would be due to activities off the public land. The Protection Alternative would specify active management for species that are rare or of special concern and are strongly dependent upon public land. The populations of these species would

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Table 2-10. Threatened and Endangered Species Management Recommendations

(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Active habitat management:				
a. Unique and sensitive species	55	55	296,860	55
b. Endangered species	24,275	0	46,759	24,275
Protective habitat management:				
a. Seasonal stipulations				
1. Bald eagle concentration areas	37,305	37,305	26,105	26,105
2. Peregrine falcon nest (only includes active nest buffer area)	30,875	30,875	24,985	24,985
b. No surface disturbance (actual sites):				
1. Peregrine falcon	0	0	480	0
2. Black-footed ferret	21,488	21,488	21,488	21,488
3. Spineless hedgehog	59,052	59,052	51,452	51,452
4. Uinta Basin hookless cactus	131,503	131,503	131,503	131,503
5. Sensitive plant species	0	0	77,300	0

become more secure and information would be developed that would be of state-wide interest.

ed with the existing allotment management plans and the grazing statement.

LIVESTOCK MANAGEMENT

Proposed Management Actions

Under all alternatives, no livestock management actions would be proposed. Livestock grazing would be managed as described in the *Grand Junction Grazing Management Environmental Statement*. An update to the grazing statement table is shown in Appendix G.

Implementation

Implementation would continue as specified in the grazing statement based upon availability of manpower and funding. Existing AMPs would be reviewed to identify conflicts between goals in the AMPs and proposed actions for soils, riparian, and water resources in the RMP. Conflicts identified would be resolved by revising the allotment management plans to agree with RMP proposed actions. The AMPs would be revised according to the EIS schedule or as they are evaluated under the study schedule.

AMPs prepared following approval of the RMP would be made compatible with RMP decisions.

Consistency

Allotment management plans would continue to be developed under all alternatives as outlined in the grazing statement and update. Other activity plans developed after the RMP would be coordinat-

Support

No additional support beyond that identified in the *Grand Junction Grazing Management Environmental Statement* would be required except as noted below. Under the Protection and Preferred Alternatives, support would be required from soils, wildlife, and water quality specialists to reevaluate management objectives in AMPs.

Effects

The effects of grazing management and the implementation of allotment management plans are described in the grazing statement.

The effects on grazing resulting from the RMP alternatives cannot be determined until existing AMPs are revised. However, actions proposed under the Protection and Preferred Alternatives to reduce soil erosion and protect riparian habitat and water quality could affect livestock management. These actions could change season of use and grazing systems and could require additional fencing and improvements.

WILD HORSE MANAGEMENT

Proposed Management Actions

The Little Book Cliffs Wild Horse Range would be managed to accommodate a herd of from 65 to 120 wild horses under all alternatives. Under the

Summary of Management Actions

Commodity, Protection, and Preferred Alternatives the wild horse range would be expanded by 2,380 acres to include the historically used critical winter range on the face of the Book Cliffs which was omitted from the original designation.

Under the Continuation of Current Management and Protection Alternatives, the Little Book Cliffs Wild Horse Range would not be available for further oil and gas and coal leasing. The pre-FLPMA leases could be developed. The lower end of Coal Canyon would be available for mine mouth facilities.

Under the Commodity and Preferred Alternatives, the horse range would be available for further oil

and gas leasing and further consideration for coal leasing. The upper end of Coal Canyon would be available for location of coal mine mouth facilities, pending further studies of the conflicts with the wild horses. Any adverse impacts identified during the study would have to be mitigated prior to lease issuance to ensure maintenance of a viable horse herd.

Seasonal limitations would be placed on disturbing activities under all alternatives. Table 2-11 shows the number of acres that would be included in the wild horse range.

Table 2-11. Wild Horse Management Recommendations

(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Existing Little Book Cliffs Wild Horse Range	27,881	27,881	27,881	27,881
Addition to Wild Horse Range.....	0	2,380	2,380	2,380
Total.....	27,881	30,261	30,261	30,261

Under the Continuation of Current Management and Protection Alternatives, the Little Book Cliffs Wild Horse Range would be identified as unsuitable for public utilities. Under the Commodity and Preferred Alternatives, the range would be identified as sensitive to public utilities. Under the Preferred Alternative only, Coal Canyon would be identified as a utility corridor for power lines only.

Implementation

The Little Book Cliff Wild Horse Management Plan would continue to be implemented.

Support

Support would be needed under all alternatives from the Divisions of Operations, Resources, and Minerals to continue project design, implementing and maintenance on the wild horse plan and to implement off-road vehicle designations.

Consistency

The Continuation of Current Management and Protection Alternatives would be consistent with the wild horse management plan. Both the Commodity and Preferred Alternatives would require revising

the horse plan because of the power line right-of-way in Coal Canyon and the further leasing of oil and gas and coal in the horse range.

Effect

The Continuation of Current Management and Protection Alternatives would have little effect on the horses or other activities. The effect of oil and gas development and forestry could be mitigated to little or no effect. Foaling activities in Coal Canyon would be protected from all disturbing activities under the Continuation of Current Management and Protection Alternatives, except for existing coal leases which could reduce the horse herd by 10 percent.

Under the Commodity and Preferred Alternatives, identifying Coal Canyon as available for further coal leasing consideration, pending further study, and mitigating any adverse impacts from possible coal development would, through lease stipulations, ensure a viable horse herd is maintained.

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CULTURAL RESOURCE MANAGEMENT

Proposed Management Actions

Under all alternatives, cultural resources would be protected from surface-disturbing activities as required by law. Project areas would be inventoried for cultural resources prior to project approval. Measures would be taken to protect any cultural resources found.

The Sinbad Valley area would be inventoried and identified as a historic site area under all alternatives. The number of archaeological sites/areas identified for active management varies under each alternative. Table 2-12 lists areas to be actively managed by alternative. Special protective measures would be taken to protect these areas. Research would be directed by the resource protection planning process reports (RP3) plans established by the State Historic Preservation Office.

Table 2-12. Cultural Resource Management Recommendations

Proposed Management Actions	Alternative (Acres)			
	CCMA	CA	ProA	PA
Sinbad Valley Historic Unit...	0	0	0	0
Indian Creek	350	350	350	350
Sieber Canyon	300	0	300	300
Ladder Springs	640	640	640	640
Rough Canyon	0	100	1,470	100
Cactus Park	0	1,000	1,000	1,000
Ten Gateway Sites	0	15	0	0
Transect 7	0	0	9,000	9,100
McDonald Creek	0	0	160	160
5ME1358	0	0	35	35
Middle Mesa	0	0	35	0
Total	1,290	2,105	12,990	11,685

The Indian Creek site would be managed as an area of critical environmental concern under the Commodity and Protection Alternatives. Rough Canyon would be managed as an area of critical environmental concern for wildlife and cultural resource values under the Protection Alternative.

Implementation

Under all alternatives, cultural resource clearances would be required before authorizing any surface-disturbing activities. Also, identified high value sites (Table 2-12) would be managed as outlined in the Grand Junction Cultural Resource Management Guide and as directed by the Office of Archaeology and Historic Preservation of The Colora-

do Historical Society in the RP-3 reports. Management plans would be prepared for these sites.

Support

Fire management would be needed to protect cultural resources from wildfires. Engineering support would be needed under all alternatives to implement cultural resource management of high value sites. Recreation input would be an important aspect of the Sinbad Valley Historic Unit Plan.

Consistency

All alternatives are consistent with the State Preservation Officer's plan (RP-3) for managing cultural resources and conform to federal regulations and laws for cultural resource preservation.

Effects

Under all alternatives, cultural resource clearances for project sites before project approval would continue to protect cultural resources from destruction and add to the data base. Active management of areas shown on Table 2-12 would increase knowledge of prehistory in this area. Acquisition of public access into Indian Creek, McDonald Creek, and Sieber Canyon could adversely impact cultural resources in these areas.

RECREATION RESOURCE MANAGEMENT

Proposed Management Actions

Three existing developed sites (Miracle Rock, Dominguez, and Mud Springs) would continue to be managed under all alternatives. The Mud Springs Recreation Site would be expanded to accommodate more group use under both the Commodity and Preferred Alternatives. A fee system would be instituted for both overnight camping and large group use.

Under the Commodity Alternative, 17 roadside rest stops would be developed. Under all alternatives, the majority of the Grand Junction Resource Area would be managed as an extensive recreation management area. This involves basic stewardship responsibilities and providing general signing, maps, and information.

Under all alternatives, areas would be identified for special recreation management, including inten-

Summary of Management Actions

sive recreation management. Table 2-13 lists the areas and describes the management proposed for each areas.

Table 2-13. Management of Special Recreation Areas

Management by Alternative			
CCMA	CA	ProA	PA
Black Ridge/Ruby Canyon (68,000 acres) would be designated as recreation lands and managed to provide for high quality backcountry/primitive recreation (minerals withdrawal, scenic river management standards to extent possible, minimum impact camping, off-road vehicle (ORV) restrictions, generally unsuitable for public utilities, visual resource management (VRM) objectives). Pending recreation lands designation, the area would be managed as an intensive recreation management area (IRMA) with objectives as listed above.	Black Ridge/Ruby Canyon (68,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. Improved boat access and shoreline recreation facilities would be provided in Ruby Canyon. Trail oriented ORV use on designated roads and trails would be encouraged in the Black Ridge area through ORV designation.	Ruby Canyon (10,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines to protect the area's natural, scenic, and riverine values. Minimum impact camping regulations would be instituted. The Black Ridge area would be recommended for wilderness designation.	Ruby Canyon (10,000 acres) would be managed under scenic river guidelines to the extent possible without formal designation. Minimum impact camping regulations would be instituted. The area would be withdrawn from mineral entry, identified as open to oil and gas leasing with no surface occupancy, managed under VRM Class II objectives, and identified as generally unsuitable for public utilities. The Black Ridge area would be recommended for wilderness designation.
The Grand Valley (176,000 acres) would be designated as an IRMA and managed to provide for urban oriented recreation. User conflicts would be minimized and group uses directed to appropriate locations. Competitive ORV events would primarily occur in the vicinity of Cycle Park and east of 27-1/4 Road.	The Grand Valley (176,000 acres) would be identified as an IRMA and managed as described under CCMA except increased recreational use would be promoted and increased use supervision would be required.	The Grand Valley (176,000 acres) would be designated as an IRMA and managed as described under CCMA except user conflicts would be reduced to a greater degree through zoning of incompatible uses and a high level of use supervision. The area allocated to intensive ORV use would be greatly reduced.	The Grand Valley (176,000 acres) would be identified as an IRMA and managed as described under CCMA except no group uses would be authorized in the Whitewater Hill, Little Park Road, or Snook's Bottom areas. Mount Garfield would be closed to ORV use. The area between 27-1/4 Road and Mount Garfield would be available for competitive events and intensive ORV use but closed to target shooting. The need for additional use supervision would be addressed in the activity plan prepared for this IRMA.
The Granite Creek area (15,000 acres) would be managed as a sensitive recreation setting.	The Granite Creek area (15,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. Directional and interpretive signing would be provided.	The Granite Creek area (15,000 acres) would be managed under semi-primitive non-motorized guidelines. The semi-primitive non-motorized guidelines would be applied to the Granite Creek canyons to protect scenic and natural values. Directional and interpretive signing would be provided.	The Granite Creek area would be managed to provide semi-primitive motorized setting and opportunities on the benches and semi-primitive non-motorized setting and opportunities in the canyons. VRM Class III objectives would apply on the benches, and VRM Class II objectives would apply in the canyons. ORV use would be limited to existing roads.

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Table 2-13. Management of Special Recreation Areas—Continued

Management by Alternative			
CCMA	CA	ProA	PA
South Shale Ridge (22,500 acres) would be managed as a sensitive recreation setting.	South Shale Ridge (22,500 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines, emphasizing the protection of the area's unique scenic and geologic values. Hiking and horseback trails and directional and interpretive signing would be provided.	South Shale Ridge (22,500 acres) would be managed as an area of critical environmental concern (ACEC) to protect unique scenic and natural values.	South Shale Ridge (22,500 acres) would be managed to protect scenic and natural values by placing the scenic and natural values stipulation on oil and gas leases and with VRM Class III management objectives. ORV use would be limited to designated roads, and no public access would be permitted on new roads.
The Gunnison River Canyon (18,000 acres) would be managed as a sensitive recreation setting.	The Gunnison River Canyon (18,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. River access points would be developed, and interpretive signing would be provided.	The Gunnison River Canyon (18,000 acres) would be designated as an IRMA and managed as described under CA except greater emphasis would be placed on protecting the area's scenic and natural values.	The Gunnison River Canyon (18,000 acres) would be managed as part of the Grand Valley IRMA and would provide for semi-primitive motorized recreation opportunities. The area would be managed under VRM Class II objectives. Provision of floatboating opportunities would be the primary recreation activity. The area would be leased for oil and gas development with the no surface occupancy stipulation.
The Hunter/Garvey Canyons area would be managed as a sensitive recreation setting.		The Hunter/Garvey Canyons area (19,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines near roads and semi-primitive non-motorized guidelines in the canyons. Emphasis would be placed on protecting the area's scenic and natural values. Directional signing would be provided.	The Hunter/Garvey Canyons area (19,000 acres) would be managed for semi-primitive motorized recreation settings and opportunities on the benches and semi-primitive non-motorized settings and opportunities in the canyons. The benches would be managed under VRM Class III objectives, and the canyons would be managed under VRM Class II objectives.
		The south slopes of Battlement Mesa (14,700 acres) would be managed as a quality hunting area. Public vehicle access on any new roads would be prohibited. Existing opportunities for hiking and horseback access into the area would be maintained.	
The Dominguez Canyon area (75,800 acres) would be managed as a wildland area to provide for high quality backcountry recreation use. The area would generally be managed to provide for primitive and semi-primitive non-motorized recreation settings and opportunities.	The Dominguez Creeks area (12,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. Foot and horse access and trails would be improved as would public information and signing to promote use.	The Dominguez Canyon area would be recommended for wilderness designation.	The Dominguez Canyon area would be recommended for wilderness designation.

Summary of Management Actions

Table 2-13. Management of Special Recreation Areas—Continued

Management by Alternative			
CCMA	CA	ProA	PA
The Sewemup Mesa area (19,140 acres) would be managed as a wildland area to provide for high quality backcountry recreation use. The area would be managed to provide for primitive recreation settings and opportunities.	The Sewemup Mesa/Sinbad Valley area (28,000 acres) would be designated as an IRMA and managed under semi-primitive motorized and primitive guidelines. Camping facilities would be developed at the mouth of Sinbad Valley, interpretive materials and signing would be developed throughout the area.	Sinbad Valley (15,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. The area's unique scenic value would be protected and interpretive materials and signing would be developed. The Sewemup Mesa area would be recommended for wilderness designation.	The Sewemup Mesa area would be recommended for wilderness designation. Sinbad Valley would be part of the Gateway IRMA and managed for semi-primitive motorized opportunities. The cliffs in Sinbad Valley (1,920 acres) would be designated as VRM Class I, and the valley bottom (8,960 acres) would be designated as VRM Class III.
The Bang's Canyon/Northeast Creek area (40,000 acres) would be managed as a sensitive recreation setting.	The Bang's Canyon/Northeast Creek area (40,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. Trail oriented ORV use, hiking, and horseback riding would be encouraged. Directional and interpretive signing would be provided.	The Bang's Canyon/Northeast Creek area (40,000 acres) would be designated as an IRMA and managed under semi-primitive motorized and semi-primitive non-motorized guidelines. The non-motorized guidelines would apply to Northeast Creek and the major canyons. Vehicle use would be limited to designated roads. The Little Park area would be managed for group use. Directional and interpretive signing would identify hiking and horseback riding trails.	The Bang's Canyon/Northeast Creek area (40,000 acres) would be designated as an IRMA and managed under semi-primitive motorized and semi-primitive non-motorized guidelines. The semi-primitive non-motorized guidelines would apply to the major canyons and Northeast Creek. Trail oriented ORV use on existing roads, hiking, and horseback riding would be encouraged. Scenic cliffs and canyons would be protected by VRM Class I designation. Directional and interpretive signing would be provided. Activity planning for this IRMA would be included in the Grand Valley activity management plan.
The Palisade area (26,050 acres) would be managed as a wildland area to provide for high quality backcountry recreation use. The area would be managed to provide for recreation settings and opportunities. The Dolores River Canyon (17,000 acres) would be managed as a sensitive recreation setting with emphasis on protecting the area's natural scenic setting for river running and highway oriented sightseeing opportunities.	The Palisade/Dolores River Canyon area (26,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines. Interpretive stops, directional signing, boat launching sites, and hiking trails would be provided.	The Dolores River Canyon area (17,000 acres) would be designated as an IRMA and managed under semi-primitive motorized guidelines, and some of the facilities would be developed as under the Commodity Alternative. The Palisade would be designated wilderness.	The Gateway area (41,000 acres) would be designated as an IRMA and managed under semi-primitive non-motorized guidelines. This IRMA would include Sinbad Valley, the Dolores River Canyon, and The Palisade area. The Palisade itself (1,920 acres) would be managed as an outstanding natural area to protect scenic and geologic values. Vehicle use would be limited to existing roads and trails, and protection of scenic values would be emphasized. The cliffs in Sinbad Valley would be managed under VRM Class I guidelines, Sinbad Valley under VRM Class III guidelines, and the Dolores River Canyon under VRM Class II guidelines. Interpretive signing would be provided.

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Implementation

Under all alternatives, recreation area management plans (RAMPs) would be prepared for each IRMA. These RAMPs would address levels and types of management and development in greater detail and allow for more specific public input. Within recreation opportunity spectrum (ROS) classes, any proposed projects would be analyzed to determine possible effects on continued availability of outdoor recreation opportunities, protection of resource values, user safety, and user conflicts. Site plans would be prepared for new facility developments. Effective designation of no-shooting zones under the Protection and Preferred Alternatives would require coordination with county agencies and the Colorado Division of Wildlife.

Support

Fire management support would be needed under all alternatives for managing natural and man-caused fires in meeting recreation resource management objectives. Cadastral survey and appraisal would be necessary for acquisition of the Loma launch site, or the existing cooperative management agreement would be modified.

Engineering support would be needed for design and construction of recreational facilities. Off-road vehicle designations would be needed to provide for intensive off-road vehicle use areas and for protection of recreational values and opportunities.

Consistency

Specific recreation management of public lands within the resource area is not addressed in the *State Comprehensive Outdoor Recreation Plan* or in the plans or regulations of other agencies or local governments. However, recreation management actions proposed under all alternatives appear to be consistent with state and local concerns as expressed through various coordination and public input actions.

Effects

Under all alternatives except the Commodity Alternative, important recreation settings would be maintained in special management areas such as wildland areas and intensive recreation management areas. Existing developed sites would be maintained.

Continued availability of important outdoor recreation opportunities would be ensured under both the Protection and Preferred Alternatives. Increased levels of use supervision would protect unique and fragile resources, promote user safety, and reduce user conflicts in intensive recreation management areas under the Commodity, Protection, and Preferred Alternatives.

VISUAL RESOURCE MANAGEMENT

Proposed Management Actions

Under all alternatives, the majority of the resource area would not be placed in visual resource management (VRM) classes. Under the Protection and Preferred alternatives, the areas recommended for wilderness designation would be managed under VRM Class I objectives. Additional areas would also be managed under VRM Class I objectives as shown in Table 2-14.

The VRM designations include the more scenic and visually sensitive areas in the Grand Junction Resource Area as identified through the visual resource management inventory and public scoping. Some scenic areas were deleted or downgraded in various alternatives to accommodate competing land uses. This was particularly true throughout the area north of the Book Cliffs and in the Roan Creek drainage. The Protection and Preferred Alternatives would provide the greatest protection to areas of high scenic value. Under the Preferred Alternative, The Palisade above Gateway would be designated an outstanding natural area to protect scenic values.

Table 2-14. Visual Resources Management Recommendations

(In Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Visual resource management class designation proposals:				
a. Class I				
(1) Wilderness study areas.....	0	0	252,555	149,087
(2) Mount Garfield.....	0	0	9,520	1,280
(3) Cliffs of Sinbad Valley.....	0	0	1,920	1,920

Summary of Management Actions

Table 2-14. Visual Resources Management Recommendations—Continued

(In Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
(4) Ruby Canyon north side	0	0	10,000	0
(5) The Palisade.....	0	0	*0	1,920
b. Class II.....	173,374	0	180,820	106,873
c. Class III.....	161,821	0	0	180,481
d. Undesignated.....	944,865	1,280,060	825,245	838,499

*Included in wilderness areas acreage.

Implementation

The VRM program is a support function, not an active program; proposed projects are evaluated for consistency with VRM objectives. Projects within designated VRM class areas would be modified to blend in with the characteristic landscape or may be denied if visual contrast would be excessive.

Consistency

The proposed VRM designations are consistent with issues identified by local, state, and federal agencies.

Support

In some areas, a limited suppression policy would help perpetuate natural, diverse ecological conditions which add variety to landscapes.

Effects

Under all alternatives except the Commodity Alternative, many of the highly scenic and highly sensitive visual resources in the Grand Junction Resource Area would be protected from visually contrasting land uses.

OFF-ROAD VEHICLE MANAGEMENT

Proposed Management Actions

Under all alternatives, critical and fragile resource values would be protected from damage due to off-road vehicle use. The protection afforded to these resources would vary by alternative. The Continuation of Current Management and Commodity Alternatives would provide the least protection while the

Protection and Preferred Alternatives would provide the greatest protection.

Under the Protection and Preferred Alternatives, areas recommended for wilderness designation would be closed to vehicle use.

Under all alternatives, an area for competitive events and intensive use would be provided. Table 2-15 shows the proposed off-road vehicle designations by alternative.

Implementation

Under all alternatives, an implementation plan would be prepared for off-road vehicle designations. Notices would be published and designations described in the Federal Register and local newspapers. Maps showing the designations would be printed and made available for public sale. Off-road vehicle designation areas would, in some places, be identified through signing; however, the off-road vehicle map would be the primary implementation tool.

Support

Under all alternatives, support would be needed from Cartography to prepare an off-road vehicle designation map. Support from a variety of resource programs (particularly wildlife, soils, water, and recreation) would be required to fund the off-road vehicle designation map, signs, and sign maintenance.

Under all alternatives, implementation of off-road vehicle designations would rely on active use supervision and a field oriented law enforcement capability.

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Table 2-15. Off-Road Vehicle Designation Recommendations

(Acres)

Proposed Designations	Alternative			
	CCMA	CA	ProA	PA
Closed.....	17,902	17,912	259,243	159,274
Limited to designated roads.....	144,155	38,370	151,410	71,651
Limited to existing roads.....	47,911	144,621	826,427	384,423
Limited to season of use every year.....	11,620	11,620	39,380	63,242
Limited to season of use in harsh winters.....	0	0	0	121,600
Open.....	1,058,472	1,067,537	3,600	479,870
Intensive/competitive use areas ¹	(100,000)	(176,000)	(3,840)	(10,240)

¹Acres identified for intensive/competitive use are included in the open category.

Consistency

Off-road vehicle designations along the south slopes of Battlement Mesa would be consistent with existing Forest Service designations only in the Protection Alternative. The Grand Mesa National Forest is now preparing an updated travel map. Through discussions with Forest Service personnel, it appears that off-road vehicle designations in the Preferred Alternative would be consistent with the new travel map, except as noted above.

There are no state and local off-road vehicle designations within the resource area. However, the Protection and Preferred Alternatives appear to be consistent with state and local policies regarding provision of trail oriented and competitive off-road vehicle use and protection of fragile resources.

Effect

Under all alternatives, identification of an area for intensive use and competitive events would streamline the permitting process for competitive events and group use. The Protection and Preferred Alternatives would provide the greatest reduction in user conflicts. Under all alternatives, in areas closed or limited to vehicle use, sensitive and unique resource value would be protected.

WILDERNESS MANAGEMENT

Proposed Management Actions

The BLM is required by the *Federal Land Policy and Management Act* of 1976 (FLPMA) to recommend wilderness study areas (WSAs) as either suitable or unsuitable for designation as wilderness. These preliminary recommendations must be made through a land use plan—in this case a resource management plan (RMP). Suitability recommendations must be made under all alternatives.

To satisfy the requirements of BLM's *Wilderness Study Policy* (1982), an all wilderness option and a no wilderness option were analyzed. Partial wilderness alternatives were analyzed in Appendix I. Appendix I provides a detailed analysis of the seven wilderness study areas.

Appendix I summarizes the BLM's *Wilderness Study Policy*. It also describes management of the four WSAs recommended for wilderness designation in the Preferred Alternative should they not be designated by Congress as wilderness.

Map 1, in the map packet, shows the seven WSA boundaries as documented in the BLM's *Final Wilderness Study Areas—Colorado*, dated November 1980. Areas recommended for wilderness designation by alternative are shown in Table 2-16 and on the alternative maps in the map packets. Wilderness recommendations are preliminary and, therefore, could change during administrative review. These recommendations would become final only if adopted by the Secretary of the Interior and the President. The President forwards these recommendations to Congress who makes the final decision on wilderness designations. Until final disposition by Congress, all seven WSAs would be managed under the BLM's *Interim Management Policy* for WSAs. Generally, this policy provides that WSAs will be managed to protect Congress' right to make the wilderness decision. In short, if an area presently has wilderness potential, it should still have this potential when Congress is to make its decision. Certain uses occurring in the WSAs at the time of the passage of FLPMA have grandfathered rights which may allow impairment of wilderness values.

Under the Continuation of Current Management, all seven WSAs would be recommended unsuitable for wilderness designation. The Colorado portion of Black Ridge Canyons and Black Ridge Canyons West WSAs would be managed primarily for recreation and would be designated as recreation lands. Sewerup Mesa, The Palisade, and Domin-

Summary of Management Actions

Table 2-16. Wilderness Management Recommendations

Proposed Management Actions	Alternative							
	CCMA		CA		ProA		PA	
	S ¹	NS ²	S	NS	S	NS	S	NS
WSAs Recommended as Suitable or Nonsuitable for Wilderness Designation								
a. Demaree Canyon.....	0	21,050	0	21,050	24,500	0	0	21,050
b. Little Book Cliffs.....	0	26,525	0	26,525	28,600	0	0	26,525
c. Black Ridge Canyons.....	0	18,150	0	18,150	20,185	0	19,595	590
d. Black Ridge Canyons West.....	0	54,290	0	54,290	55,015	0	54,342	673
e. The Palisade.....	0	26,050	0	26,050	26,180	0	0	26,050
f. Dominguez Canyon.....	0	75,800	0	75,800	78,935	0	56,315	19,495
g. Sewemup Mesa.....	0	19,140	0	19,140	19,140	0	18,835	305
Total:.....	0	³ 241,005	0	241,005	252,555	0	149,087	94,688

¹S = Suitable

²NS = Nonsuitable

³Reflect actual acreage for all WSAs including public land in the Montrose, Colorado, and Moab, Utah, Districts.

quez Canyon WSAs would be managed as wildland areas. The Little Book Cliffs WSA would be managed for wild horses, and Demaree Canyon WSA would be managed for coal and oil and gas.

Under the Commodity Alternative, all seven WSAs would be recommended nonsuitable for wilderness designation. The Little Book Cliffs WSA would be managed for wild horses, coal, and oil and gas; and the Demaree Canyon WSA would be managed for coal and oil and gas. The Palisade would be managed for oil and gas, wildlife, and forestry. The Dominguez Canyon and Black Ridge Canyons WSAs would be managed primarily for wildlife and forestry.

Under the Protection Alternative, all seven WSAs would be recommended for wilderness designation. All WSA boundaries except Sewemup Mesa would be expanded to improve manageability (252,555 acres total).

Under the Preferred Alternative, portions of the Black Ridge Canyons, Black Ridge Canyons West, Dominguez Canyon, and Sewemup Mesa WSAs would be recommended suitable for wilderness designation (144,087 acres total). The Demaree Canyon WSA would be managed primarily for coal and oil and gas, and the Little Book Cliffs WSA would be managed for wild horses, coal, and oil and gas. A portion of The Palisade WSA (1,920 acres) would be designated as an outstanding natural area, and the remainder of the area would be managed under general multiple use guidelines.

Under the Preferred Alternative, boundaries would be expanded in the Black Ridge Canyons WSAs to create one larger, more manageable unit. In these units and Dominguez Canyon, several roads would be included in the WSAs. These would still be available for administrative use by grazing permittees in accordance with BLM's *Wilderness*

Management Policy. Other boundary modifications in the WSAs would be made to improve manageability by minimizing resource conflicts such as preventing trespass. Boundary modifications are shown in Appendix I.

Implementation

Following the completion of the resource management plan, a wilderness study report identifying the wilderness suitability or nonsuitability recommendations for each WSA will be prepared and submitted to Congress. Appendix I explains the procedures and roles involved in the wilderness reporting process. The wilderness study report will be accompanied by a separate final environmental impact statement on the wilderness portion of the plan. This draft environmental impact statement serves as the draft for both the final environmental impact statement on the resource management plan and the final wilderness environmental impact statement.

Only Congress has the authority to add an area to the National Wilderness Preservation System. After wilderness designation, a wilderness management plan would be written for each area designated. Fire management plans would also be developed for these areas. Once an area is designated as wilderness, the provisions of the Wilderness Act apply and BLM will manage the areas to preserve wilderness character and provide for the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

If the Demaree Canyon and Little Book Cliffs WSAs are designated wilderness, the existing pre-FLPMA leases will have to be further analyzed for environmental impacts. This will be done in an envi-

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ronmental analysis for each new application for permit to drill or mine plan.

Support

Mineral surveys by the U.S. Geological Survey and the U.S. Bureau of Mines would be required for WSAs recommended as preliminarily suitable for wilderness designation as requested by the BLM Director. Fire management support would be needed for the preparation of fire management plans and for management of natural fire in meeting the resource objective and for the protection of unique and fragile resources for designated wilderness. Cadastral survey will be needed to define some wilderness boundaries. Support from the Operations staff would be needed for right-of-way and land acquisition.

Consistency

Wilderness designation is generally consistent or not addressed in the local plans. Under the Protection Alternative, the major inconsistency is with the West Central Colorado Coal Environmental Statement which identifies areas to be developed for coal in the Demaree Canyon and Little Book Cliffs WSAs.

Effects

Under the Continuation of Current Management Alternative, wilderness values in the Black Ridge Canyons and Black Ridge Canyons West WSAs would generally be protected through management of the area primarily for recreation and designation of the area as recreation lands. Dominguez Canyon, The Palisade, and Sewemup Mesa WSAs would be managed as wildlands, which would help to protect wilderness values.

Under the Commodity Alternative, wilderness values would not be protected in any of the seven WSAs. Surface-disturbing activities permitted under this alternative would generally result in the loss of wilderness characteristics.

Under the Protection Alternative, wilderness characteristics would be protected through wilderness designation in all WSAs except the Little Book Cliffs and Demaree Canyon WSAs. In these two areas, development of pre-FLPMA oil and gas and coal leases would adversely impact wilderness characteristics.

Under the Preferred Alternative, wilderness characteristics would be protected in the Black Ridge Canyons, Black Ridge Canyons West, Sewemup Mesa, and Dominguez Canyon WSAs through wil-

derness designation. Wilderness characteristics in the Demaree Canyon, Little Book Cliffs, and The Palisade WSAs would be lost because of permitted surface-disturbing activities.

SPECIAL MANAGEMENT AREAS

Proposed Management Actions

Special management areas consist of areas of critical environmental concern (ACECs), research natural areas (RNAs), and outstanding natural areas (ONAs). Table 2-17 shows which areas would receive a special management area designation by alternative. Overlapping designations that would provide similar management or protection would not be made under the Continuation of Current Management, Commodity, or Preferred Alternatives. More specific management of these areas is included in the appropriate emphasis area narrative, and impacts are discussed under the appropriate resources.

Implementation

Management of special management areas would be prescribed in site-specific activity plans prepared upon completion of this resource management plan. Management objectives for these areas are included in the emphasis area narratives. Designations would become final upon approval of this resource management plan.

Support

Fire support would be needed to protect unique and fragile resources. Assistance would be required from a variety of resource specialists to prepare site-specific activity plans.

Consistency

State and local land use plans do not address special management areas. However, state and local regulations do address protection and management of unique and fragile resources. To the best of our knowledge, these recommendations for special management area designations are consistent with those regulations.

All areas recommended as a special management area in the preferred alternative would be available for listing on the state's Natural Areas Program administered by the Colorado Department of Natural Resources.

Summary of Management Actions

Table 2-17. Special Management Areas Recommendations
(Acres)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Proposed for ACEC Designation:				
a. Indian Creek (cultural resources)	0	350	350	0
b. Baxter/Douglas Pass soil slump (soil hazard)	0	18,000	18,000	0
c. Cactus Park soil area (cultural resources and soil stabilization)	0	800	1,500	0
d. Skipper's Island (riparian values)	0	160	160	0
e. South Shale Ridge (scenic values)	0	0	22,500	0
f. Mount Garfield/slopes of Grand Mesa (scenic values)	0	0	9,520	0
g. Badger Wash Uplands (sensitive plants)	0	0	1,230	0
h. Rough Canyon (endangered plants, scenic values, and cultural resources)	0	0	1,470	0
Total:	0	19,310	54,170	0
Proposed for RNA Designation:				
a. Unaweeep Seep (sensitive butterflies)	37	37	37	37
b. Pyramid Rock (endangered plants)	470	0	470	470
c. Gunnison Gravels (geologic processes)	0	0	5	5
d. Rough Canyon (endangered plants, scenic values, and cultural resources)	0	0	0	1,470
e. Fruita Paleontological Site (geologic processes)	0	0	280	280
f. Rabbit Valley paleontological site (geologic processes)	0	0	280	280
Total:	507	37	1,072	2,542
Proposed for ONA Designation:				
a. The Palisade (scenic values)	0	0	0	1,920

Effects

Protection and management of unique or fragile resources would not be provided through ACEC designation under the Continuation of Current Management and Preferred Alternatives. However, under the Preferred Alternative, the Indian Creek archaeological site would be identified for active management, the Baxter/Douglas Pass soil slump area would be protected from surface-disturbing activities, the Cactus Park soil area would be stabilized, Mount Garfield would be designated and managed as a VRM Class I area and the adjacent cliffs and slopes of Grand Mesa as VRM Class II, sensitive plants in the Badger Wash Uplands would be protected from surface-disturbing activities, and Rough Canyon would be designated as a research natural area. Skipper's Island would be identified for disposal.

The Palisade ONA would be protected from all discretionary management decisions involving surface-disturbing activities in all alternative except the Commodity Alternative. Also, it would be managed under VRM Class I guidelines in the Preferred Alternative, recognizing valid existing rights.

LAND TENURE ADJUSTMENTS

Proposed Management Actions

Disposal. Under the Continuation of Current Management Alternative, land tenure adjustment proposals would be processed and analyzed as received, based upon available funding.

Under the Commodity, Protection, and Preferred Alternatives, specific tracts would be identified for disposal as shown on Maps 3, 4, and 5 (see map pocket). All tracts identified for disposal would comply with the planning criteria discussed in Chapter 1.

Under all alternatives, the primary emphasis for disposal would be on exchanges, and the secondary emphasis would be on sales. Some disposal tracts would be included in a statewide exchange pool. All public lands identified for disposal would be in the best interest of the public in order to (1) increase management efficiency, (2) make lands available for more intensive use or development, (3) make lands available for management by another government entity, or (4) serve the national interest.

Under all alternatives, the mineral estates would be conveyed with the surface where mineral values are not known to exist or where retaining the mineral rights would interfere with or preclude nonmineral

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development of the land which is a more beneficial use of the land than mineral development.

Public land identified for retention could be considered for exchange to improve management efficiency or to meet the needs under the Recreation and Public Purposes Act.

Acquisition. Private land would be identified for acquisition under all alternatives. The preferred method of acquiring this private land would be through exchange of identified disposal tracts. Private land identified for acquisition is generally located within the Little Book Cliffs Wild Horse Range, special management areas, or areas recommended for wilderness designation (see emphasis area narratives).

Under the Commodity, Protection, and Preferred Alternatives, in addition to identified acquisitions, the BLM would consider exchanging identified disposal tracts or other suitable public land for suitable private lands. The private lands would have to lie within or adjacent to large blocks of public land or have special resource values needed by BLM to improve resource management. Following are examples of the types of private land that would be considered for acquisition through exchange:

1. Private lands within areas recommended as suitable for designation as wilderness.
2. Private lands needed for management of wild and scenic rivers and wild and scenic study rivers.
3. Potential national or historic trails.
4. Potential natural or research natural areas.
5. Potential areas for cultural or natural history designation.
6. Potential areas of critical environmental concern.
7. Private lands within designated wild horse preserves.
8. Private lands with potential for other Congressional designations.
9. Threatened or endangered species habitat areas.
10. Riparian habitat areas.
11. Valuable recreation areas.
12. Wetland areas as defined in Executive Order 11990, dated May 24, 1977.
13. Flood plain areas (100-year) as defined in Executive Order 11988, dated May 24, 1977.

Table 2-18 summarizes the acres and tracts recommended for disposal and acquisition.

Table 2-18. Land Tenure Adjustment Recommendations

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
Disposal:				
a. Acres	0	41,550	7,635	27,956
b. Tracts	0	207	91	155
Acquisition:				
a. Acres	896	1,049	3,579	1,889
b. Tracts	5	7	14	8

Implementation

Under the Continuation of Current Management Alternative, environmental assessments and land reports would be prepared for all suitable exchange and sale proposals. Proposals determined to be in the public interest would be approved.

Under the Commodity, Protection, and Preferred Alternatives, an activity plan would be prepared for land tenure adjustments. The activity plan would identify the general sequence of disposal and recommend disposal methods. Disposal tracts would then undergo further screening through environmental assessments and land reports. Tracts determined to be in the public interest to transfer would be approved for disposal.

Some of the disposal tracts would be suitable for cooperative management agreements (CMA) or transfer to Colorado Division of Wildlife (CDOW), the U.S. Forest Service, local governments or qualified environmental groups. CDOW has indicated an interest in lands with riparian values. The city of Fruita has indicated an interest in lands located southwest of Fruita for recreational purposes. Mesa County has indicated an interest in recreational lands in the Grand Valley. If these transfers or CMAs are not feasible, then the tracts would be recommended for private exchange or sale.

Private lands offered to BLM in exchange for public lands will be evaluated using the criteria identified in the acquisition section.

Support

Support would be needed under all alternatives for appraisal reports, mineral reports, and cultural clearances. Some of the tracts will also require threatened and endangered species clearances and/or paleontological clearances. Support may be needed for conducting cadastral surveys on some of the tracts.

Summary of Management Actions

Consistency

Coordinating and conferring with affected state and local governments would continue concerning land tenure adjustments. In preparation of an activity plan, close coordination and consultation with affected counties would be made to establish priorities and methods of disposal to minimize adverse impacts. The proposed land tenure adjustments appear to be consistent with state and local plans and regulations.

Garfield and Mesa Counties have reviewed the draft for the Commodity, Protection, and Continuation of Current Management Alternatives. State and county governments will be notified 60 days prior to any disposal.

Effects

Under the Continuation of Current Management Alternative, suitable exchange and sale proposals would be evaluated on a case-by-case basis without the benefit of an activity plan to guide the land tenure adjustments.

Under the Commodity, Protection, and Preferred Alternatives, an activity plan would be prepared to guide the land tenure adjustments. Disposal of approximately 41,550 acres of public land in the Commodity Alternative, 7,635 acres in the Protection Alternative, and 27,956 acres in the Preferred Alternative

would decrease the amount of public land in the Grand Junction Resource Area available for multiple use management by 3 percent, less than 1 percent, and 2 percent, respectively. Acquisition of private land through exchange would offset some of these decreases. Many of these isolated disposal tracts cannot be used by the general public because there is no legal access. Administrative efficiency would be improved by disposal of these isolated tracts which are uneconomic to manage and by acquisition of private tracts within large blocks of public land.

TRANSPORTATION MANAGEMENT

Proposed Management Actions

Under the Continuation of Current Management Alternative, only roads or trails identified in approved activity plans would be acquired. Other easements would be acquired only as specific management problems were encountered.

Under the Commodity, Protection, and Preferred Alternatives, additional miles of road and trail easements would be acquired for a variety of resource management needs. Table 2-19 lists the purpose of each easement acquisition recommendation. Map 5 shows general locations of easement acquisitions that would be acquired under the Preferred Alternative.

Table 2-19. Transportation Management Recommendations

Name of Road or Trail	Miles of Easement Required	Alternative								
		CCMA		CA		ProA		PA		Map No. ³
		Type of Access ¹	Benefiting Resource ²	Type of Access ¹	Benefiting Resource ²	Type of Access ¹	Benefiting Resource ²	Type of Access ¹	Benefiting Resource ²	
Adobe	1.25	PT	WH,Rec	PT	WL,WH,Rec	PT	WH,Rec	PT	WH	(01)
Bull Draw .....	.25					PT	WN	PT	Rec	(34)
Carpenter .....	.5			PT	WL,WH,Rec	PT	WH,Rec	PT	WH,Rec	(02)
Devil's Canyon	1.5			PT	Rec	AT	WL	PT	Rec,WN	(14)
Flume Canyon .....	.75			PT	Rec			PT	Rec,WN	(13)
Hawxhurst Creek	1.25			PT	Rec,WL					
North Fork West Creek .....	.5					AT	WL			
Pollack .....	.25			PT	Rec	PT	Rec	PT	Rec	(11)
Little Dominguez	1.5					PT	WN,Rec	PT	WN	(12)
Snyder Flats Horse .....	.25			PT	Rec,WL,Rg					
Barrel Springs	1.25			PR	F,WL,Rec	PR	F,WL,Rec	PR	Rec,WL,F	(09)
Baxter/Douglas Pass	5.25			PR	F,WL,Rec			AR	Rec,WL,F,Rg,O	(10)
Beehive	1.25					PR	WL,Rg,Rec			
Brush Mountain	2.5			PR	F,Rec,WL,Rg	PR	WL	PR	Rec,WL,F,Rg	(23)
Buniger Road	2.25			PR	F,WL,Rg,Rec	PR	F,WL,Rg,Rec	PR	Rec,F,WL,Rg	(05)
Carr Creek	10.0			PR	Rec,F,WL	PR	Rec,F,WL	PR	Rec,WL,F,Rg	(21)
Chalk Mountain	2.0			PR	F,WL,Rg,Rec	AR	Rg,F			
Cactus Park .....	.25			PR	F,WL,Rg,Rec	PR	F,WL,Rg,Rec	PR	F,WL,Rg,Rec	(36)
Coates Creek .....	.25			PR	F,WL,Rec	PR	F,WL,Rec	AR	F	(30)
Cow Ridge	2.0			PR	Rec,F,WL,Rg	PR	Rec,Rg	PR	Rec,F,WL,Rg	(24)
Crawford Peak	3.5	AR	(Comm. site)	AR	(Comm. site)	AR	(Comm. site)	AR	(Comm. site)	(29)
Douglas Pass East	1.75			PR	F,WL,Rg,Rec	PR	WL,Rg	PR	Rec,WL,F,Rg	(04)
Corcoran Wash	1.25			PR	WL,Rg,WH,Rec	PR	Rg,WH,Rec	PR	Rec,F,Rg	(07)
4-A Mountain	3.5			PR	F,WL,Rg,Rec	PR	Rg	PR	Rec,F,Rg	(22)
Haystack Mountain	4.0					AR	WL			
Horse Mountain	1.5			PR	Rec,F,WL,Rg	PR	Rg,Rec	PR	Rec,F,Rg	(26)
Hunter Canyon-Bronco Flats .....	.5				F,O					
Indian Creek .....	.25			PR	Rec,F,WL,Rg	PR	Rg,Rec	PR	Rec,Rg,WL	(17)
Little Dolores	4.25			PR	Rg,Rec	AR	WL,Rg			
Logan Wash	1.25			PR	F,Rec	PR	Rec			
Mitchell Road .....	.5			PR	WL,Rec,O			PR	Rec,O	(37)
Middle North Dry Fork	11.5	PR	WL,F,Rg,Rec	PR	Rec,F,WL,Rg	PR	Rg,Rec	PR	Rec,F,WL,Rg	(25)
Prairie Canyon	1.5			PR	F,WL,Rg,Rec	PR	Rg,Rec	PR	F,Rec,Rg	(08)
McDonald Creek .....	.75			PR	Rec	PR	Rec,C	AR	C,Rec	(20)
Reeder Ridge	1.5			PR	Rec,WL					
Roan Creek	2.5			PR	F,WL,Rg,Rec	PR	WL,Rg			
Sieber Canyon	2.0			PR	Rec	AR	C			
Sinbad-Sewemup .....	.5			PR	F,Rec	PR	WL,C	PR	Rec,WN	(15)
Snyder Flats South .....	.5			PR	Rec,F,WL,Rg	AR	F,Rg,Rec	AR	F	(33)
South Canyon	1.5			PR	F,WL,Rg,Rec	PR	F,WL,Rg	PR	Rec,F,Rg	(06)
Timber Ridge	2.0			PR	F,WL,Rg,Rec	PR	F,Rg	AR	F	(31)
29 Road	1.0			PR	Rec	PR	Rec	PR	Rec	(18)
33 Road	1.5			PR	Rec	PR	Rec	PR	Rec	(19)
Upper Big Salt Wash	2.25			PR	F,WL,Rg,Rec	PR	WL,Rg			
Unaweep to Little Park	1.25			PR	Rec,F,WL,Rg	PR	Rg,Rec	PR	Rec,F,Rg	(32)

Snyder Flats North	6.5	.....	.....	AR	F .....	.....	.....	AR	F	(35)
Hunter Canyon .....	.5	.....	.....	.....	.....	PT	Rec	PT	Rec	(03)
Hopple Gulch .....	.25	.....	.....	.....	.....	.....	.....	AR	Rec,WL,F	(27)
Tater Hills .....	.25	.....	.....	.....	.....	.....	.....	AR	Rec,WL,F	(28)
Black Ridge .....	.25	.....	.....	PT	Rec,WL .....	.....	.....	PT	Rec,WL	(16)
Silt Cutoff .....	.75	.....	.....	PT	Rec,WL .....	.....	.....	.....	.....

¹Type of access: P = Public; A = Administrative; R = Road; T = Trail

²Benefiting resource: Rec = Recreation; F = Forestry; WL = Wildlife; WH = Wild Horses; C = Cultural; WN = Wilderness; Rg = Range; O = Oil and Gas

³Map No.: Corresponds to map no. on Preferred Alternative Map

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Implementation

Under all alternatives, a resource area wide transportation plan, a site-specific route analysis, and environmental assessment for each easement proposal would be prepared. These analyses would recommend the best approach for acquiring the easement and specific routes. The transportation plan would be closely coordinated with off-road vehicle designations and with local, state, and federal agencies. The transportation plan would identify specific roads or types of roads to be closed and rehabilitated. It would also identify those roads that are to remain open for proper management of the resource area.

Under the Preferred Alternative, some of the twelve access locations in the De Beque/Book Cliffs area would be analyzed for acquisition after the preparation of an activity plan. Property owners and local, county and state agencies would be asked to attend a workshop to address positive and negative aspects of acquiring each easement. BLM managers would then select the most appropriate route(s) based on information gained at the workshops.

Support

Cadastral survey would be needed for boundary determination and corner identification. District survey would be needed for the accurate plotting of easement locations. Appraisal reports would be needed to identify acquisition costs. Cartographic support would be needed for plat preparation. Legal support would be needed from the solicitor's and U.S. Attorney's offices for title and acquisition problems. Engineering support would be needed in project design, implementation, and maintenance.

Consistency

U.S. Forest Service and Colorado Division of Wildlife programs require public access across public land. Since the Continuation of Current Management Alternative fails to provide access to many blocks of public land, it is not consistent with the U.S. Forest Service and Colorado Division of Wildlife transportation needs.

Proposed roads and trails under the other alternatives are consistent with the transportation plans

of the Grand Mesa and White River National Forests. It is consistent with other BLM RMPs throughout the region. It is also consistent with state and local government plans.

Effects

Transportation management is a support function that enables the implementation of resource related recommendations and proposals. The effects of acquiring or not acquiring an easement would jeopardize the implementation of the proposed recommendations.

Continuation of Current Management Alternative. Resource programs which require additional access to accomplish resource objectives as defined in this alternative would be adversely affected. Examples include recreation resource management and forest management.

Commodity, Protection, and Preferred Alternatives. A moderate amount of new legal access would be provided to nearly all large blocks of public land. These would provide significant beneficial impacts to resource programs relying on legal access to accomplish management objectives.

PUBLIC UTILITIES MANAGEMENT

Proposed Management Actions

Under the Continuation of Current Management Alternative, all proposals to construct public utilities would be considered as received. Under all alternatives, the use of existing routes would be encouraged.

Under all alternatives, suitable, sensitive, and unsuitable zones for public utilities would be designated. Suitable areas contain no known resource concerns that would preclude public utility routing. Sensitive areas contain resources that might be impacted by public utility routing; thus, mitigation would be included as part of any utility project proposal or right-of-way grant stipulations. Unsuitable areas contain resource concerns that could not be adequately mitigated; thus, public utility projects would not be allowed. Table 2-20 shows which areas would be designated as either suitable, sensitive, or unsuitable for public major utilities by alternative.

Summary of Management Actions

Table 2-20. Public Utility Restriction Recommendations

Resource Concern	CCMA		CA		ProA		PA	
	Unsuit-able	Sensi-tive	Unsuit-able	Sensi-tive	Unsuit-able	Sensi-tive	Unsuit-able	Sensi-tive
SOILS MANAGEMENT								
Douglas/Baxter Pass soil slump.....	18,000	0	0	18,000	18,000	0	18,000	0
Cactus Park erosive soils.....	0	0	0	1,500	0	1,500	0	0
Plateau Creek slump.....	0	0	0	860	860	0	860	0
Steep slopes.....	0	0	0	0	0	200,000	0	200,000
WATER RESOURCES MANAGEMENT								
Badger Wash hydrologic study area.....	685	0	85	0	(685)	0	(685)	0
Palisade municipal watershed.....	0	4,640	0	4,640	0	4,640	0	4,640
Grand Junction municipal watershed.....	560	0	0	0	0	560	1,240	0
Jerry Creek Reservoirs.....	0	0	0	0	0	0	0	1,160
Perennial streams.....	0	6,145	0	0	0	6,145	0	6,145
GEOLOGY/PALEONTOLOGY								
Fruita Paleontological Site.....	280	0	280	0	280	0	280	0
Rabbit Valley paleontological site.....	0	280	0	0	280	0	280	0
Gunnison Gravels.....	0	5	0	0	5	0	5	0
Black Ridge angiosperm.....	0	0	0	0	(40)	0	(40)	0
WILDLIFE								
Deer and elk winter range.....	0	238,820	0	13,500	0	238,820	0	238,820
Bighorn sheep winter range.....	0	12,600	0	26,800	0	2,560	0	6,200
Elk calving areas.....	0	7,139	0	1,920	0	7,139	0	7,139
Skipper's Island.....	160	0	160	0	160	0	160	0
Rough Canyon.....	0	0	0	0	0	0	(1,470)	0
THREATENED AND ENDANGERED SPECIES								
Bald eagle concentrations areas.....	0	37,305	0	37,305	0	37,305	0	37,305
Peregrine falcon habitat.....	0	30,875	0	30,875	0	30,875	0	30,875
Black-footed ferret.....	0	21,488	0	21,488	0	21,488	0	21,488
Spineless hedgehog cactus.....	0	59,052	0	59,052	0	59,052	0	59,052
Uinta Basin hookless cactus.....	0	131,503	0	131,503	0	131,503	0	131,503
Sensitive plant species.....	0	0	0	0	0	73,600	0	0
<i>Cryptantha elata</i> site.....	0	0	0	3,700	3,700	0	0	0
Badger Wash Uplands.....	0	0	0	0	1,230	0	0	0
Pyramid Rock.....	0	470	0	0	470	0	470	0
Unaweep Seep natural area.....	37	0	37	0	37	0	440	0
Colorado cutthroat trout.....	0	0	0	100	100	0	0	100
WILD HORSE MANAGEMENT								
Wild horse range.....	27,881	0	0	0	11,232	0	0	30,261
Wild horse winter range.....	0	0	0	6,500	0	0	0	(6,500)
Wild horse foaling area.....	0	0	0	(6,500)	0	0	0	(6,500)
VISUAL RESOURCES MANAGEMENT								
Juanita Arch.....	0	40	0	0	40	0	40	0
Rattlesnake arches.....	0	0	0	0	(1,920)	0	0	0
The Goblins.....	80	0	80	0	80	0	80	0
Colorado River corridor.....	0	7,040	0	0	7,040	0	0	7,040
Ruby Canyon.....	0	8,000	0	0	8,000	0	8,000	0
Dolores River Canyon.....	0	27,000	0	0	17,000	0	17,000	0
Gunnison River corridor.....	0	18,000	0	18,000	0	18,000	8,960	9,040
South Shale Ridge.....	0	22,500	0	22,500	22,500	0	0	22,500
Mount Garfield cliffs.....	0	7,000	0	7,000	9,520	0	9,520	0
Grand Mesa slopes.....	0	9,600	0	4,600	9,600	0	9,600	(13,440)
Bang's Canyon.....	0	40,000	0	40,000	0	40,000	14,080	25,920
Sinbad Valley.....	0	15,000	0	8,860	15,000	0	1,920	(1,470)
Granite Creek.....	0	15,000	0	15,000	0	15,000	2,240	12,760
De Beque/Mount Logan.....	0	6,400	0	0	0	6,400	0	0
Unaweep Canyon.....	0	50,000	0	0	0	40,000	14,080	6,400
Collbran valley.....	0	0	0	0	0	16,000	0	0
Hunter/Garvey Canyons.....	0	19,000	0	0	19,000	0	7,600	11,400
Vega Reservoir viewshed.....	0	0	0	0	0	0	0	120

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Table 2-20. Public Utility Restriction Recommendations—Continued

Resource Concern	CCMA		CA		ProA		PA	
	Unsuitable	Sensitive	Unsuitable	Sensitive	Unsuitable	Sensitive	Unsuitable	Sensitive
Highway 139 (Douglas Pass)	0	0	0	0	0	10,800	(1,920)	19,200
I-70 (Grand Junction to Stateline)	0	0	0	0	0	0	0	8,320
Black Ridge corridor.....	0	0	0	0	0	0	860	0
CULTURAL RESOURCES MANAGEMENT								
Indian Creek.....	350	0	350	0	350	0	350	0
Rough Canyon	0	0	0	0	0	0	(1,000)	0
Cactus Park.....	0	0	0	(640)	0	640	1,000	0
Sieber Canyon	0	300	0	0	0	0	300	0
McDonald Creek	0	0	0	0	0	160	160	0
5ME1358	0	0	0	0	0	0	35	0
Ladder Springs.....	640	0	640	0	640	0	640	0
Transect 7	0	0	0	0	9,000	0	0	9,000
RECREATION RESOURCE MANAGEMENT								
Black Ridge recreation lands	68,000	0	0	68,000	0	0	0	0
Sewemup Mesa recreation lands	19,140	0	0	19,140	0	0	0	0
Dominguez Canyon	75,800	0	0	12,000	0	0	0	0
The Palisade ONA.....	26,000	0	0	26,000	0	0	1,920	0
Developed recreation sites.....	0	160	0	160	160	0	160	0
Island Acres	0	80	0	80	0	80	80	0
Vega Reservoir	0	2,160	0	2,160	0	2,160	2,160	0
Highline Reservoir	0	1,100	0	1,100	0	1,100	1,100	0
Unaweeep overlook.....	0	0	0	0	0	5	0	0
Dominguez Recreation Site.....	0	40	0	40	0	40	40	0
Bridgeport trailhead	0	640	0	0	0	640	0	640
Collbran valley	0	0	0	0	0	1,600	0	0
New West Creek.....	0	0	0	5	0	0	0	0
Existing West Creek	0	0	0	5	0	0	0	0
Prairie Canyon.....	0	0	0	10	0	0	0	0
West Salt Creek.....	0	0	0	10	0	0	0	0
Barrel Springs	0	0	0	25	0	0	0	0
Big Salt Creek.....	0	0	0	10	0	0	0	0
Mitchell Pond	0	0	0	5	0	0	0	0
Ruby Canyon overlook.....	0	0	0	80	0	0	(80)	0
Little Park Road.....	0	0	0	7,700	0	7,700	0	7,700
Whitewater Hill.....	0	0	0	10,900	0	10,900	0	0
Snook's Bottom	0	0	0	2,000	0	2,000	0	0
Rabbit Valley.....	0	0	0	10,900	0	10,900	0	0
27-1/4 and 29 Roads	0	0	0	25,600	0	25,600	0	0
Coal Canyon.....	0	0	0	6,400	0	6,400	0	0
Battlement Mesa	0	0	0	0	0	14,700	0	0
Pine Mountain roadside	0	0	0	0	0	320	0	320
WILDERNESS MANAGEMENT								
Black Ridge Canyons.....	0	0	0	0	76,200	0	73,937	0
Sewemup Mesa	0	0	0	0	19,140	0	18,835	0
Dominguez Canyon	0	0	0	0	78,935	0	56,305	0
Demaree Canyon.....	0	0	0	0	24,500	0	0	0
Little Book Cliffs	0	0	0	0	28,600	0	0	0
The Palisade	0	0	0	0	26,180	0	0	0
LAND TENURE ADJUSTMENT								
Disposal tracts	0	0	0	41,550	0	7,640	0	27,956
Gross total	191,119	799,382	2,232	707,583	407,799	1,069,972	272,737	943,644
Estimated sensitive restriction overlap.....	0	-180,540	0	-196,140	-5,000	-308,440	-5,000	-412,120
Total.....	191,119	618,842	2,232	511,443	402,799	761,532	267,737	531,524

Note: () indicates overlap with another area.

Summary of Management Actions

The Western Regional Corridor Study (Public Service Company of Colorado, 1980) identified five proposed utility routes in the Grand Junction Resource Area, and these routes were considered under all alternatives.

Under the Preferred Alternative, eight utility corridors would be designated for specified uses as shown on Table 2-21.

Table 2-21. Public Utility Corridor Recommendations

Location	Type of Utility	Approximate Corridor Width
Unaweep Canyon.....	Telephone and small electrical lines	One-half mile
Between Colorado National Monument and Black Ridge Canyons WSA.	Small water, telephone, and electrical lines	One-quarter mile
Along MAPCO pipeline in West Salt Creek	Major pipelines and power lines	One-half mile
Along Northwest Pipeline and State Highway 139.	Major pipelines and power lines	One-half mile
Coal Canyon	Major power lines	One-half mile
From De Beque to southern boundary of resource area.	Major power lines	Four miles
Along Roan Creek from De Beque to the Community Center.	Railroads; power lines; major water and oil and gas pipelines	One mile
Along Clear Creek.....	Major power lines and pipelines from Community Center to northern resource area boundary	One-half mile

Implementation

Under all alternatives, applications for land use authorizations would be compared with the zones and then processed on a case-by-case basis as outlined in BLM regulations. All approved authorizations would include stipulations to mitigate impacts associated with their authorization and development, including appropriate stipulations from Appendix C, Standard Design Practices.

Applications within unsuitable zones would be rejected, except where valid existing rights require granting of authorization.

Applications in sensitive areas would be considered if mitigation measures could reduce the potential impacts of the project on the identified sensitive resource. In most cases, applicants would be encouraged to seek alternate locations when available.

In all zones, use of current corridors or upgrading of existing facilities would be encouraged.

Under the Preferred Alternative, additional corridors would be designated upon issuance of rights-of-way grants for several pending utility project proposals. These pending proposals are the Clear Creek Shale Oil Project, Mobil and Pacific Oil Shale Projects, and the Grand Valley Conversion Project through Coal Canyon.

Support

Engineering and surface reclamation support would be needed under all alternatives for design

analysis and mitigation recommendations on some project proposals. In addition, under all alternatives, appraisal support would be needed for large project proposals.

Consistency

By coordinating and conferring with affected local governments as part of the authorization process, consistency with their plans would continue to be attempted under the Continuation of Current Management Alternative.

The concept of identifying sensitive and unsuitable zones under the Protection, Commodity, and Preferred Alternatives has received support from Mesa and Garfield Counties. The designated corridor concept has also received support from the counties and several utility companies. Three of the five proposed utility corridors identified in the Western Regional Corridor Study were not recommended for corridor designation in the Preferred Alternative due to (1) a minor amount of BLM surface ownership, and (2) conflicts with proposed wilderness. The proposed corridors are consistent with the Piceance Basin RMP, the Grand Mesa Forest Plan, and the Grand Resource Area (Utah) RMP.

Effects

Identification of zones as unsuitable, sensitive, and suitable for consideration would help utility companies design proposals for land use authorizations. This practice would reduce processing costs

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and increase efficiency. Those resource values present in the unsuitable and sensitive zones (Table 2-20) would be protected from damage by utility companies.

FIRE MANAGEMENT

Proposed Management Actions

Under all alternatives, fire on public land would be managed as directed by five fire response levels—critical, full, limited, prescribed, and wilderness. Table 2-22 shows the number of acres within each response level.

Table 2-22. Summary of Proposed Fire Management

(In Acres Unless Otherwise Noted)

Response Levels	Alternative			
	CCMA	CA	ProA	PA
Critical.....	0	32,000	22,300	18,950
Full	792,658	573,019	412,489	976,790
Limited	460,402	642,441	423,964	107,880
Prescribed	27,000	32,600	27,000	27,000
Wilderness	0	0	394,307	149,087

Critical suppression is the taking of immediate, aggressive action to contain and control all fires. Human and equipment resources are committed at an increasing rate until the objective of fully protecting the threatened area is met. Areas designated for this level of response are considered of high value or high risk.

Full suppression is the taking of aggressive action by forces sufficient to contain the fire by 10 a.m. of the day following ignition. If a fire escapes containment during this period, any continuing suppression action is planned to minimize total resource losses, suppression and rehabilitation costs, and environmental damage.

Limited suppression implies minimal response to fires in areas where hazards to firefighters and suppression costs are high and where fire results in positive or neutral effects on resource values. Limited suppression response levels are set forth in fire management plans covering the designated areas. As a minimum response, limited suppression area fires are monitored. Response levels are established following an analysis of fire's effects on the values-at-risk.

Wilderness suppression implies restraint in fire suppression methods that occur in the designated areas. In these areas the fire management objec-

tive is to manage fire in ways that will cause the least degradation to wilderness values. The areas may be managed as limited suppression areas. Response levels are determined using value-at-risk and cost-benefit ratio analysis.

Prescribed burning is used for vegetative manipulation to improve range and wildlife habitat. These are intentionally ignited fires set pursuant to established burn management plans in order to meet land and resource management objectives. All wild-fires in prescribed burning areas would be managed according to one of the above categories.

Implementation

Under all alternatives, fire management plans would be written for limited suppression, prescribed fire, critical protection, and wilderness areas. Specific boundaries and prescriptions would be designated to meet the identified objectives of the areas.

Support

Support for presuppression planning and suppression resources and operations would be required from the U.S. Forest Service, Mesa and Garfield County Sheriff Offices, Western Slope Fire Operations, Colorado State Forest Service, and local fire protection districts.

Consistency

The proposed actions are consistent with U.S. Forest Service and BLM policies. They have been discussed with the Colorado State Forest Service and other agencies involved in wildland fire management and were favorably received.

Effects

By specifying where fire is detrimental or where it would have a neutral or positive net effect, money would be saved from the limited suppression of nondetrimental fires. Moreover, some resource values would benefit from the appropriate limited suppression of fires.

COMPARISON OF ALTERNATIVES

Table 2-23 summarizes the major land allocations that would occur under the various alternatives. It is a composite summary of the tables pre-

Comparison of Alternatives

sented earlier in this chapter by resource. The purpose of this section is to point out major differ-

ences between the alternatives and provide a clearer basis for comparison.

Table 2-23. Summary Comparison of Management Action Recommendations

(In Acres Unless Otherwise Noted)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
SOILS MANAGEMENT				
Treatment of critically-eroding soils.....	0	800	1,500	1,000
Treatment of soil slump hazard area	18,000	0	0	18,860
WATER RESOURCES MANAGEMENT				
Sediment reduction	117,000	175,600	164,700	169,600
Salinity reduction	133,000	146,300	146,300	146,300
Sediment and salinity project maintenance.....	6,060	6,060	6,060	6,060
Miles identified for stream channel stabilization	27.3	63.3	58.1	63.3
Municipal watershed protection	14,000	14,000	14,000	14,000
Badger wash hydrologic research	685	685	685	685
Sinbad Valley salinity control study.....	50	50	50	50
LOCATABLE MINERALS MANAGEMENT				
Open to location	1,266,548	1,334,548	893,329	1,180,881
Closed to location:				
a. existing withdrawals	124,843	124,843	124,843	124,443
b. proposed withdrawals.....	68,000	0	1441,219	154,420
Total:.....	192,843	124,843	566,062	278,510
COAL MANAGEMENT				
Coal development potential area.....	364,489	364,489	364,489	364,489
Acceptable for further coal leasing consideration	325,968	350,389	223,137	350,389
Unacceptable for further coal leasing consideration:				
a. unsuitable based on coal unsuitability.....	14,100	14,100	14,100	14,100
b. unacceptable based on multiple use tradeoffs	24,421	0	127,252	0
Total:.....	38,521	14,100	141,352	14,100
OIL AND GAS MANAGEMENT				
Open to Leasing:				
a. with standard lease terms.....	608,383	1,125,664	471,595	624,701
b. with stipulations.....	482,771	333,727	735,241	685,603
1. no surface occupancy	(43,439)	(9,842)	(307,044)	(131,340)
2. others.....	(439,332)	(323,885)	(428,197)	(554,263)
Total open	1,091,154	1,459,391	1,206,596	1,309,711
Closed to leasing	111,838	0	252,555	149,087
Undesignated (case-by-case basis)	256,399	0	0	0
MINERAL MATERIALS MANAGEMENT				
Open to sales and free use permits.....	1,355,565	1,450,511	840,597	1,171,215
Closed to sales and free use permits:				
a. existing withdrawals	6,188	6,188	6,188	6,188
b. proposed closures	97,638	2,692	1612,606	282,341
Total:.....	103,826	8,880	618,794	288,176
FOREST MANAGEMENT				
Commercial forest land ^a suitable for management	0	0	0	1,319
Commercial forest land unsuitable ^a for management.....	39,105	39,105	39,105	37,786
Commercial forest land annual allowable harvest (MMBF).....	0	0	0	0
Pinyon-juniper woodlands ^a suitable for management	109,050	127,236	88,666	111,244
Pinyon-juniper woodlands unsuitable ^a for management	427,034	408,848	447,418	424,840
Pinyon-juniper woodlands annual allowable harvest (cords).....	3,900	4,800	3,300	4,200
Pinyon-juniper woodlands annual reduced allowable harvest (cords) ⁷	2,600	3,200	2,200	2,800

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Table 2-23. Summary Comparison of Management Action Recommendations—Continued

(In Acres Unless Otherwise Noted)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
WILDLIFE MANAGEMENT				
Active habitat management: ^a				
a. upland wildlife				
1. deer, elk, bighorn sheep.....	792,033	1,132,745	731,697	1,018,059
2. wild turkey and grouse.....	55,000	214,575	74,654	77,554
3. bear.....	259,846	273,830	260,830	273,830
4. pronghorn.....	196,753	219,100	207,870	209,100
5. waterfowl and desert gamebirds.....	150,253	209,100	207,870	209,100
b. sport fisheries management				
1. number of streams.....	22	23	22	22
2. miles of stream.....	71	97	71	71
Protective habitat management:				
a. deer and elk critical winter range and migration corridors ^a	238,820	13,500	238,820	238,820
b. elk calving area.....	7,139	1,920	7,139	7,139
c. bighorn sheep range:				
1. protected by special stipulations.....	15,851	26,800	2,560	6,200
2. protected by wilderness or recreation designations.....	15,139	4,190	28,430	24,780
No surface disturbance (actual sites):				
a. elk calving sites.....	0	100	500	500
b. riparian area.....	6,145	140	6,145	6,145
c. Skipper's Island.....	160	160	160	0
THREATENED AND ENDANGERED SPECIES MANAGEMENT				
Active habitat management: ^a				
a. unique and sensitive species.....	55	55	297,820	55
b. endangered species.....	24,275	0	46,759	24,275
Protective habitat management:				
a. seasonal stipulations				
1. bald eagle concentration areas.....	37,305	37,305	26,105	26,105
2. peregrine falcon nest (only includes active nest buffer area).....	30,875	30,875	24,985	24,985
b. No surface disturbance (actual sites):				
1. peregrine falcon.....	0	0	480	0
2. black-footed ferret.....	21,488	21,488	21,488	21,488
3. spineless hedgehog.....	59,052	59,052	51,452	51,452
4. Uinta Basin hookless cactus.....	131,503	131,503	131,503	131,503
5. sensitive plant species.....	0	0	77,300	0
WILD HORSE MANAGEMENT				
Existing wild horse range.....	27,881	27,881	27,881	27,881
Addition to wild horse range.....	0	2,380	2,380	2,380
Total.....	27,881	30,261	30,261	30,261
CULTURAL RESOURCE MANAGEMENT				
Number of sites recommended for active management.....	3	5	9	8
Recommended for active management.....	1,290	2,105	12,990	11,685
RECREATION RESOURCE MANAGEMENT				
Proposed for IRMA designation:				
a. acres.....	193,000	405,500	310,000	257,000
b. number of areas.....	2	9	8	3
Existing recreation sites:				
a. acres.....	120	120	120	120
b. number of sites.....	3	3	3	3
Proposed roadside stops:				
a. acres.....	0	250	0	0
b. number of sites.....	0	17	0	0
Proposed as quality hunting area.....	0	0	14,700	0

Comparison of Alternatives

Table 2-23. Summary Comparison of Management Action Recommendations—Continued

(In Acres Unless Otherwise Noted)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
VISUAL RESOURCE MANAGEMENT				
Visual resource management class designation proposals:				
a. Class I	0	0	273,995	154,200
b. Class II	173,374	0	180,820	106,873
c. Class III	161,821	0	0	180,481
d. Undesignated	944,865	1,280,060	825,245	838,499
OFF-ROAD VEHICLE MANAGEMENT				
Closed	17,902	17,912	259,243	159,274
Limited to designated roads	144,155	38,370	151,410	71,651
Limited to existing roads	47,911	144,621	826,427	384,423
Limited to season of use every year	11,620	11,620	39,380	63,242
Limited to season of use in harsh winters	0	0	0	121,600
Open	1,058,472	1,067,537	3,600	479,870
Intensive/competitive use areas ¹⁰	(100,000)	(176,000)	(3,840)	(10,240)
WILDERNESS MANAGEMENT				
Recommended as nonsuitable for wilderness:				
a. Demaree Canyon	21,050	21,050	0	21,050
b. Little Book Cliffs	26,525	26,525	0	26,525
c. Black Ridge Canyons	18,150	18,150	0	0
d. Black Ridge Canyons West	54,290	54,290	0	0
e. The Palisade	26,050	26,050	0	26,050
f. Dominguez Canyon	75,800	75,800	0	19,495
g. Sewemup Mesa	19,140	19,140	0	305
Total:	¹¹ 241,005	241,005	0	93,425
Recommended as suitable for wilderness:				
a. Demaree Canyon	0	0	24,500	0
b. Little Book Cliffs	0	0	28,600	0
c. Black Ridge Canyons	0	0	20,185	¹² 19,830
d. Black Ridge Canyons West	0	0	55,015	¹² 54,470
e. The Palisade	0	0	26,180	0
f. Dominguez Canyon	0	0	78,935	56,315
g. Sewemup Mesa	0	0	19,140	18,835
Total:	0	0	252,555	149,087
SPECIAL MANAGEMENT AREAS				
Proposed for ACEC designation:				
a. Indian Creek (cultural resources)	0	350	350	0
b. Baxter/Douglas Pass soil slump (soil hazard)	0	18,000	18,000	0
c. Cactus Park soil area (cultural resources and soil stabilization)	0	800	1,500	0
d. Skipper's Island (riparian values)	0	160	160	0
e. South Shale Ridge (scenic values)	0	0	22,500	0
f. Mount Garfield/slopes of Grand Mesa (scenic values)	0	0	9,520	0
g. Badger Wash Uplands (sensitive plants)	0	0	1,230	0
h. Rough Canyon (endangered plants, scenic values, and cultural resources)	0	0	1,470	0
Total:	0	19,310	54,170	0
Proposed for RNA Designation:				
a. Unaweep Seep (sensitive butterflies)	37	37	37	37
b. Pyramid Rock (endangered plants)	470	0	470	470
c. Gunnison Gravels (geologic processes)	0	0	5	5
d. Rough Canyon (endangered plants, scenic values, and cultural resources)	0	0	0	1,470
e. Fruita Paleontological Site (geologic processes)	0	0	280	280
f. Rabbit Valley paleontological site (geologic processes)	0	0	280	280
Total:	507	37	1,072	2,542
Proposed for ONA designation				
a. The Palisade (scenic values)	0	0	0	1,920

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Table 2-23. Summary Comparison of Management Action Recommendations—Continued

(In Acres Unless Otherwise Noted)

Proposed Management Actions	Alternative			
	CCMA	CA	ProA	PA
LAND TENURE				
Disposal:				
a. acres.....	0	41,550	7,635	27,956
b. tracts.....	0	207	91	155
Acquisition:				
a. acres.....	896	1,049	3,579	1,889
b. tracts.....	5	7	14	8
TRANSPORTATION MANAGEMENT				
Miles of road recommended for acquisition.....	17.0	80.75	71.75	¹³ 65.0
Miles of trail recommended for acquisition.....	.5	6.75	6.25	¹³ 6.75
Areas identified for easement acquisition.....	4	38	34	¹³ 35
PUBLIC UTILITIES MANAGEMENT				
Suitability recommendations:				
a. Suitable.....	470,099	766,385	115,729	480,799
b. Sensitive.....	618,842	511,443	761,532	531,524
c. Unsuitable.....	191,119	2,232	402,799	267,737
Corridor recommendations:				
a. acres.....	0	0	0	67,580
b. number.....	0	0	0	8
FIRE MANAGEMENT				
Response levels				
a. Critical.....	0	32,000	22,300	18,950
b. Full.....	792,658	573,019	412,489	976,790
c. Limited.....	460,402	642,441	423,964	108,233
d. Prescribed.....	27,000	32,600	27,000	27,000
e. Wilderness.....	0	0	¹³ 394,307	¹³ 149,087

¹Includes 252,552 acres recommended for wilderness designation.

²Includes 149,087 acres recommended for wilderness designation.

³Includes 45,419 acres recommended for wilderness designation.

⁴Includes Douglas-fir, aspen, ponderosa pine, and spruce-fir.

⁵Based upon multiple use and TPCC restrictions. With completion of TPCC for CFL, revision in acreage and calculation of an allowable harvest would be necessary. The majority of the CFL is in small, isolated stands on steep ground and is uneconomical to manage now or in the foreseeable future.

⁶Includes pinyon pine and juniper.

⁷This harvest level for fuelwood reflects a reduction to compensate for trespass. This reduction is an estimate based upon field observation and public input. A study will be done at a later date to determine the exact amount of trespass, and the allowable harvest will be adjusted accordingly at that time.

⁸The indicated species or groups are the key wildlife management species on the acres shown.

⁹Includes critical migration corridors.

¹⁰Acres identified for intensive/competitive use are included in the open category.

¹¹These are the existing WSA acres.

¹²Includes 1,860 acres outside the Black Ridge Canyons WSAs that would enhance management of the area for wilderness.

¹³Includes a number of easement acquisition options to the same area.

MANAGEMENT OF EMPHASIS AREAS

Following is a description of how particular geographic areas would be managed under each alternative. These geographic areas are called emphasis areas. Emphasis areas were delineated as explained in Appendix A. They are shown on Maps 2 through 5 in the map pockets. The management ascribed to these emphasis areas provide the basis

for the information presented in the Summary of Management Actions.

Within each emphasis area, the management of a particular resource would be emphasized over all other resources. That is not to say that other resources would be excluded. They would be allowed so long as they were compatible with management of the emphasized resource.

Future proposals can be evaluated in the context of the management philosophy of the emphasis

Continuation of Current Management Alternative

area to determine if the proposal would be compatible or incompatible.

CONTINUATION OF CURRENT MANAGEMENT ALTERNATIVE (MAP 2)

Areas A-1: Emphasis on Recreation

Recreation. Approximately 68,000 acres in the Black Ridge area would be designated as recreation lands and managed to preserve and enhance existing recreational values.

Water. Water developments consistent with recreation management plans would be allowed. In areas accessible by roads, bulldozing, pipelines, and troughs would be allowed if compatible with recreation activity recommendations. In inaccessible areas or where roads or trails are not desired, existing springs would be developed by hand or blasting of slick rock catchment reservoirs.

Locatable Minerals. The entire area (68,000 acres) would be withdrawn from location under the general mining laws.

Oil and Gas. The area would be closed to leasing to protect scenic and natural values.

Mineral Materials. Approximately 68,000 acres would be closed to mineral materials sales or free use permits.

Forestry. Approximately 10,027 acres of productive pinyon-juniper woodlands would be identified as unsuitable for management and harvesting other than to control insects and diseases to protect recreational values.

Wilderness. The Black Ridge Canyons Wilderness Study Areas would be recommended to Congress as nonsuitable for wilderness designation.

Wildlife. Suitable habitat would be provided for the reintroduction and management of bighorn sheep.

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails.

Public Utilities. The entire area would be designated unsuitable for public utilities.

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas A-2: Emphasis on Recreation

Recreation. The Dominguez Canyon and Sewemup Mesa areas would be identified and managed as wildland areas.

Locatable Minerals. The entire area would be available for mineral location except for those areas closed because of existing withdrawals.

Oil and Gas. Approximately 12,197 acres in the Sewemup Mesa recreation lands would be closed to leasing to protect recreational values. Also, 8,040 acres would be closed to protect recreation and scenic values in the canyons of the Dominguez Canyon area. Approximately 13,363 acres would be available for leasing with a no surface occupancy stipulation to protect scenic and natural values and a developed campground. Approximately 15,051 acres would be subject to additional stipulations to protect threatened and endangered species, deer and elk winter range, and perennial streams. All remaining acreage would either be leased with standard lease terms or would not be assigned to a leasing category until a lease is proposed (undesigned).

Mineral Materials. The entire area would be closed to mineral materials sales or free use permits.

Forestry. Approximately 12,636 acres of productive pinyon-juniper and 451 acres of commercial forest land would be identified as unsuitable for management and harvesting other than to control insects and diseases to protect recreational values. (This acreage includes 2,915 acres of productive pinyon-juniper woodlands and 17 acres of commercial forest land in the Montrose District.)

Wildlife. Deer winter range would be provided for the support of a 200 percent increase in deer densities.

Off-Road Vehicles. Approximately 13,000 acres on Sewemup Mesa would be closed to vehicle use. Vehicle use in the Dominguez Canyon area would be limited to the following existing roads: 7363 (Long Mesa), 7367B (Middle Mesa), and 7363C.

Visual Resources. Existing visual management Class II designations would be maintained.

Wilderness. Both the Dominguez Canyon and Sewemup Mesa Wilderness Study Areas would be recommended to Congress as nonsuitable for wilderness designation.

Public Utilities. The entire area would be designated unsuitable for public utilities.

Transportation. New road construction would be prohibited.

Fire. The entire emphasis area would be managed as a limited suppression area.

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Area A-3: Emphasis on Recreation

Recreation. The Palisade would be identified as a wildland area and managed to protect its natural setting.

Locatable Minerals. The entire area would be open to mineral location.

Oil and Gas. Approximately 2,803 acres would be available for leasing with a no surface occupancy stipulation to protect recreational values. The remaining acreage would not be assigned to a leasing category until a lease is proposed.

Mineral Materials. The entire area would be closed to mineral materials sales or free use permits.

Forestry. Approximately 1,654 acres of productive pinyon-juniper woodlands and 112 acres of commercial forest land would be identified as unsuitable for management and harvesting other than to control insects and diseases to protect wildland values.

Wildlife. A high priority would be placed on maintaining riparian habitat on North Creek.

Threatened and Endangered Species. The sensitive plant Dolores skeletonweed would be protected from surface disturbance. Suitable habitat would be provided for the maintenance of a peregrine falcon eyrie. Surface disturbance would be prohibited within one-quarter mile of active peregrine falcon nests.

Wilderness. The Palisade Wilderness Study Area would be recommended to Congress as nonsuitable for wilderness designation.

Visual Resources. The Palisade would be managed as a visual resource management Class II area.

Off-Road Vehicles. The area would be identified as limited to designated roads and trails.

Public Utilities. The Palisade (2,803 acres) and the butterfly area (about 440 acres) would be designated unsuitable for public utilities to protect scenic and natural values and a threatened species.

Fire. The entire emphasis area would be managed as a limited suppression area.

Area Cc: Emphasis on Coal

Coal. Approximately 325,968 acres would be identified as acceptable for further coal leasing consideration. The Little Book Cliffs and Demaree Canyon Wilderness Study Areas, presently identified as unsuitable based on Coal Unsuitability Criterion 4, would be added to this acceptable acreage following Congressional release from wilderness

review. The Colorado River corridor would be identified as unsuitable based on Coal Unsuitability Criteria 3 and 16, respectively (see Appendix D). Approximately 162,658 acres of sensitive resources would be identified as vulnerable to damage from coal development based on Coal Unsuitability Criteria 2, 3, 7, 9, 10, 11, 13, 14, 15, and 19 (see Appendix D). Stipulations would be placed on coal development within these areas to protect the sensitive resources.

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Oil and Gas. Approximately 124,637 acres would be available for leasing with stipulations to protect threatened and endangered species, deer and elk winter range, elk calving areas, and perennial streams. All remaining acreage would either be leased with standard lease terms or would not be assigned to a leasing category until a lease is proposed (undesigned). Approximately 18,080 acres would be available for leasing with a no surface occupancy stipulation to protect unstable soils and the Goblins scenic area. Existing leases within the Demaree Canyon WSA would be developed subject to the unnecessary and undue standard if nonimpairment could not be met.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits.

Forestry. Approximately 15,924 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Approximately 600 acres of pinyon-juniper in the following locations would be identified as unsuitable for management and harvesting: Mount Garfield (264 acres), adverse location; Corcoran Point (336 acres), fragile soils.

Wildlife. Aquatic and riparian habitat and critical deer and elk winter range identified by the coal unsuitability review (see Appendix D) would be protected by stipulations either on the coal lease or mine plan. East and Big Salt Creeks and two miles of Plateau Creek would be managed for sport fisheries (8 miles).

Threatened and Endangered Species. Threatened, endangered, and sensitive species identified by the coal unsuitability review (see Appendix D) would be protected by stipulations either on the coal lease or mine plan.

Cultural Resources. Significant cultural resources would be protected by stipulations either on the coal lease or mine plan and on oil and gas leases.

Recreation. Surface-disturbing activities would be restricted to protect unusual scenic and geologic

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features in the Goblins and South Shale Ridge area. Surface-disturbing activities would also be restricted in the Hunter, Garvey, and Demaree Canyon areas to protect scenic and natural values.

Off-Road Vehicles. The area would be identified as open to vehicle use. Limiting public access on haul roads would be considered during mine plan review.

Visual Resources. Visual resource management Class II areas on Mount Garfield and associated cliffs and on the slopes of the Grand Mesa above Palisade would be maintained.

Wilderness. The Demaree Canyon Wilderness Study Area would be recommended to Congress as unsuitable for wilderness designation.

Public Utilities. The Baxter/Douglas Pass soil slump (18,000 acres) and the Goblins (80 acres) would be designated unsuitable for public utilities. Island Acres (80 acres) and perennial streams would be identified sensitive for public utilities.

Transportation. BLM roads, identified by the coal unsuitability review as sensitive (see Appendix D) would be protected by stipulations on leases or mine plans.

Fire. Approximately 214,780 acres would be managed as full suppression lands, 177,100 acres would be managed as limited suppression lands, and 14,000 acres would be treated by prescribed burning.

Areas Ee: Emphasis on Wild Horses

Wild Horses. The wild horse habitat and wild horses would be managed to maintain a wild horse herd of approximately 65-120 horses. The wild horses would be rounded up and the excess horses adopted where a vegetation study indicates the area is being overused. The area would be expanded from 27,881 acres by the proposed acquisition of 816 acres of private land.

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Coal. The entire wild horse range, including that portion within the Little Book Cliffs WSA would be unavailable for further consideration for coal leasing.

Oil and Gas. The entire area would be closed to further leasing of oil and gas to protect the wild horse range. Existing leases in the WSA could be developed subject to the unnecessary or undue degradation standard if nonimpairment could not be met.

Mineral Materials. The area would be closed to mineral materials sales or free use permits.

Forestry. Approximately 6,639 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Fuelwood sales would be limited to commercial operators only. Fuelwood sales also would be limited to 30 acres or less and would be designed to meet management objectives for wild horses.

Wildlife. Oil and gas exploration and development would be prohibited from December 1 to May 1 within critical deer winter range.

Threatened and Endangered Species. Surface-disturbing activities would be prohibited from January 15 to July 15 within one-quarter mile of active golden eagle nests and from February 15 to July 15 near active peregrine and prairie falcon nests.

Recreation. The area would be managed as an extensive recreation management area.

Off-Road Vehicles. Coal Canyon would be closed to vehicle use from March 1 to June 30 and limited to existing roads and trails during the remainder of the year. The remainder of the emphasis area would be limited to existing roads and trails year-round.

Wilderness. The Little Book Cliffs Wilderness Study Area would be recommended to Congress as unsuitable for wilderness designation.

Land Tenure. Eight hundred sixteen acres of private land within the existing wild horse range would be identified for acquisition.

Public Utilities. The entire area would be designated unsuitable for public utilities.

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas F: Emphasis on Water

Water. The Palisade municipal watershed and Badger Wash hydrologic study area would be identified as sensitive watersheds. Activities within the Palisade watershed would be limited to those that would not disturb the water quality and quantity. The effects of surface-disturbing activities would continue to be studied in the Badger Wash hydrologic study area.

Locatable Minerals. The entire area would be available for mineral location except for those areas closed because of existing withdrawals.

Oil and Gas. Approximately 2,388 acres would be available for leasing with special stipulations to protect deer and elk winter range. Six hundred eighty-five acres would be available for leasing with

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a no surface occupancy stipulation to protect a watershed study area.

Mineral Materials. The entire area would be open to mineral materials sales and free use permits except a 685 acre closure for the Badger Wash hydrologic area.

Coal. The Palisade municipal watershed would be identified as unsuitable for further coal leasing consideration based on Coal Unsuitability Criteria 17 (see Appendix D). The existing coal leases (covering 4,000 acres) would be allowed to develop. Stipulations to protect the watershed would be added to the mine plan during the mine plan approval process.

Forestry. Approximately 805 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting.

Threatened and Endangered Species. Disturbing activities would not be permitted within one-quarter mile of active nests of golden eagles from January 15 to July 15, and of peregrine and prairie falcons from February 15 to July 15.

Recreation. The Palisade municipal watershed would not be available for intensive recreation.

Off-Road Vehicles. The Badger Wash hydrologic study area and the Palisade municipal watershed would be closed.

Public Utilities. The Badger Wash hydrologic study area would be designated unsuitable for public utilities. The Palisade municipal watershed would be designated sensitive for public utilities.

Fire. The entire emphasis area would be managed for full suppression.

Areas N: Emphasis on Threatened and Endangered Species

Threatened and Endangered Species. Pyramid Rock would be designated as a research natural area and managed to protect one sensitive and one endangered plant species. Unaweep Seep would continue to be a Colorado state natural area and managed as a research natural area. Unaweep Seep would continue to be managed to protect its unique environment and a sensitive butterfly.

Locatable Minerals. Both areas would be available for mineral location.

Oil and Gas. Unaweep Seep (37 acres) would be closed to leasing. Pyramid Rock (470 acres) would be available for leasing with the no surface occupancy stipulation to protect endangered or sensitive species.

Mineral Materials. Both areas would be closed to mineral materials sales or free use permits.

Wildlife. Deer and elk winter range adjacent to the Unaweep Seep would be improved to draw use out of the seep area.

Recreation. Both areas would be unavailable for intensive recreation management or use.

Special Management Area. Designate Pyramid Rock as a BLM research natural area. Continue designation of Unaweep Seep as a Colorado state natural area and a BLM research natural area.

Off-Road Vehicles. Unaweep Seep would be closed to vehicle use. Pyramid Rock would be limited to designated roads and trails.

Land Tenure. Approximately 80 acres in the Unaweep Seep would be identified for acquisition.

Public Utilities. Unaweep Seep (37 acres) would be designated unsuitable, and Pyramid Rock (470 acres) would be designated sensitive for public utilities.

Fire. The entire emphasis area would be managed both as a full and limited suppression area. Full suppression efforts would be used to prevent fire entering the area; once fire is burning within the area, suppression efforts would be undertaken in a manner calculated to minimize surface and species disturbance.

Areas K: Emphasis on General Natural Resource Management

Soils. The unstable talus slopes in Unaweep Seep (440 acres), the De Beque slide area (860 acres), and the Baxter/Douglas Pass area (18,000 acres) would be identified as sensitive soils areas.

Water. Structures in Indian Wash and Leach Creek would be maintained to control floods and reduce salinity and sediment. The Sinbad Valley salinity control project would continue to be studied. Stream bank erosion would be treated in and near the Dominguez Recreation Site. Salinity control structures would continue to be constructed in Leach Creek.

Locatable Minerals. The area would remain open to mineral location.

Oil and Gas. Approximately 274,702 acres would be available for leasing with additional stipulations to protect perennial streams, deer and elk winter range, elk calving areas, threatened and endangered species, and the Dolores River corridor. Approximately 8,038 acres would be available for leasing with a no surface occupancy stipulation to protect a portion of the Grand Junction municipal watershed, Indian Wash dam, sensitive visual resources, three developed recreation sites, and the Highline Reservoir recreation site. Approximately

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3,000 acres would be closed to leasing to protect the Fruita Paleontological Site, Skipper's Island, the Cactus Park archaeological site, and Vega Reservoir recreation area. All remaining acreage would either be leased with standard lease terms or would not be assigned to a leasing category until a lease is proposed (undesignated).

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except 565 acres would be closed to mineral materials sales or free use permits for Rabbit Valley and Fruita paleontological sites and the Gunnison Gravels.

Paleontological Resources. The Fruita Paleontological Site, the Rabbit Valley paleontological site, and the Black Ridge fossil site would be identified as high value paleontological sites. The Rabbit Valley paleontological site would continue to be managed for educational and research purposes. The Fruita paleontological site would continue to be managed primarily for research purposes, and the Black Ridge fossil site would be studied for possible designation as a research natural area.

Forestry. Approximately 86,479 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Approximately 3,617 acres of pinyon-juniper woodlands in the following locations would be identified as unsuitable for management and harvesting: Gibbler Mountain (79 acres), adverse location; Gateway (2,865 acres), adverse location; Pinyon Mesa (673 acres), adverse location; and Little Dolores (15 acres), recreational values. Road construction would be minimized; forest roads would be closed and rehabilitated where appropriate. A woodlands management plan would be prepared for the Tenderfoot Mesa/Outlaw Mesa and/or Little Book Cliffs area.

Wildlife. A high priority would be placed on preserving riparian habitat. Proposed projects within these areas would be carefully evaluated. Proposed projects would be carefully evaluated within critical deer and elk winter ranges, migration routes, and bighorn sheep range. Disturbing activities within these areas would be limited during the critical seasons. The Uncompahgre Plateau would be managed to increase deer, elk, and wild turkey populations. Suitable habitat would be provided on the Uncompahgre Plateau for the reintroduction of wild turkey. Decreased harvest rates for deer and elk would be recommended to the Colorado Division of Wildlife, and large snags and fruit-bearing shrubs would be left for wild turkey. Deer and elk distribution would be improved on the Uncompahgre Plateau by constructing watering sites and performing seeding projects. The Glade Park area would be identified and managed as important habitat for

deer, elk, wild turkey, and grouse. Watering sites would be constructed and land would be seeded in the Glade Park area to extend deer and elk distribution. Deer and elk distribution would be improved in the Kannah Creek and Grand Valley areas by constructing watering sites and seeding at least 472 acres. Waterfowl and fisheries habitat also would be improved in both areas. Deer and elk distribution would be improved in the Plateau Creek area by constructing a watering site and a seeding project. Suitable habitat would be provided in the Dominguez Canyon area for the reintroduction of bighorn sheep and chukar. Trout fisheries would be maintained along 61 miles on 20 streams.

Threatened and Endangered Species. The habitats of sensitive plants and animals would be protected. Surface-disturbing and human activities would be limited within one-quarter mile of peregrine falcon and other raptor nests. A population of prairie dogs would be maintained in the area north of the Colorado River to provide habitat for the black-footed ferret. Approximately 4 miles of Colorado River cutthroat trout habitat would be improved in the Roan Creek drainage.

Cultural Resources. The Sieber Canyon, Indian Creek, and Ladder Springs sites would be identified as high value sites and actively managed. The Sinbad Valley Historic Unit project would be implemented.

Recreation. The Black Ridge/Ruby Canyon area would be designated as recreation lands (see also Area A-1). Ruby Canyon would be managed to preserve scenic river designation potential. Commercial river permits would continue to be issued. Loma Launch would continue to be managed in cooperation with the Colorado Division of Wildlife. Surface-disturbing activities would be prohibited in the Black Ridge/Ruby Canyon area.

The Grand Valley would be designated as an intensive recreation management area, and managed primarily for intensive urban-oriented recreation. Competitive off-road vehicle permits would continue to be issued at Cycle Park and on public land east of Cycle Park. Rabbit Valley, 27-1/4 Road, Whitewater Hill, Horse Mountain, 29 Road, Little Park Road, and Snook's Bottom would be identified as special group event areas. Recreation on Skipper's Island would be restricted to protect riparian values.

Cactus Park and lower Unaweep Canyon would be identified for group use and special events with stipulations to protect cultural values, sensitive soils, and incompatible uses. Trailhead management would continue at Bridgeport. Surface-disturbing activities along the Gunnison River to Whitewater would be restricted to protect natural

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values. Floatboating permits for commercial use of public land would be issued along the Gunnison River. Surface-disturbing activities associated with forest management, mineral material sales, and public utilities would be restricted in Unaweep Canyon, Big and Little Dominguez Creeks, Granite Creek, Bang's Canyon, Northeast Creek, and Demaree Canyon. Surface-disturbing activities would be restricted in the Garvey Canyon area and along the south face of South Shale Ridge as appropriate to protect unique geologic features and scenic values. The Dolores River downstream from Gateway would be managed to maintain scenic river designation potential. Hanggliding opportunities would be maintained in Reeder Ridge.

The remainder of the emphasis area would be managed as an extensive recreation management area.

Off-Road Vehicles. The Beehive Road would be closed from December 1 to May 1. The BLM would cooperate with the U.S. Forest Service on seasonal road closures in the Lands End area chainings (December 15 to April 1) and the Indian Creek area (350 acres). The following areas would be closed to all vehicular use: the last mile of road to Rattlesnake Arches, Skipper's Island (except I-70), the *Cryptantha elata* site on Whitewater Hill, Fruita paleontological site, Pollack Canyon, and the Bridgeport trailhead. The remainder of the emphasis area would be designated open to vehicle use.

Visual Resources. Mount Garfield and the adjacent cliffs for 3 miles in each direction and the slopes of Grand Mesa above Palisade would be designated as visual resource management Class II areas. Ruby Canyon and the Dolores River also would be designated as visual resource management Class II areas.

Wilderness. The Black Ridge Canyons Wilderness Study Area would be recommended to Congress as unsuitable for wilderness designation.

Public Utilities. The following areas would be designated sensitive for public utilities: the Fruita paleontological site (280 acres), south slope of South Shale Ridge (2,560 acres), developed recreation sites (60 acres), Rabbit Valley paleontological site (280 acres), visual resource management Class II areas (150,000 acres), and recreation resource management areas (101,800 acres).

Transportation. Public access would be acquired on Middle Dry Fork and Timber Ridge. Administrative access would be acquired to the communication site on Crawford Peak. Public trail access would be acquired on the Carpenter Trail.

Fire. The entire emphasis area would be managed for full suppression on 569,158 acres; for limited

suppression on 62,170 acres; and for treatment by prescribed fires on 13,000 acres.

COMMODITY ALTERNATIVE (MAP 3)

Areas Co-1: Emphasis on Oil and Gas

Oil and Gas. Approximately 23,825 acres would be available for leasing with an additional stipulation to protect peregrine falcon habitat. All remaining acreage would be available for leasing with standard lease terms.

Water. BLM would continue to cooperate with the U.S. Bureau of Reclamation in the study of the Sinbad Valley salinity control project. Measures would be taken to reduce sediment on approximately 21,000 acres of severe and critically-eroding soils along the Dolores River and in the Blue Creek area. Approximately 14 miles of actively-eroding stream channels would be treated along Blue Creek, John Brown Canyon, and Bull Draw.

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except for those areas closed because of existing withdrawals.

Forestry. Approximately 26,945 acres of productive pinyon-juniper would be identified as suitable for management and harvesting. Approximately 4,226 acres of pinyon-juniper in the following locations would be identified as unsuitable for management and harvesting: John Brown (2,865 acres), adverse location, Sewmup Mesa (504 acres), adverse location; and The Palisade (857 acres), adverse location.

Wildlife. Habitat for a 100 percent increase in deer would be maintained on the Uncompahgre Plateau. A high priority would be placed on maintaining riparian habitat. Suitable habitat would be provided for the reintroduction of wild turkey and chukar. Watering sites would be developed and about 300 acres would be seeded to improve deer and elk distribution. A sport fishery would be maintained along 15 miles of three streams--Calamity, Blue and North Fork of Mesa Creek.

Threatened and Endangered Species. Oil and gas exploration and development would be prohibited within one-quarter mile of active peregrine falcon nests.

Cultural Resources. Surface-disturbing activities would be prohibited on 10 high value sites. The

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Sinbad Valley area would be identified as a historic project, and a Class III survey would be conducted.

Recreation. Sewemup Mesa/Sinbad Valley (28,000 acres) and The Palisade/Dolores River (53,000 acres) would be managed as intensive recreation management areas. Trails would be developed for foot and horse use in the Sewemup Mesa/Sinbad Valley area. A small campground would be developed in Sinbad Valley. The Dolores River would be managed as a recreational river, and four boat launch/day use areas would be developed. The remainder of the emphasis area would be managed as an extensive recreation management area.

Wilderness. Sewemup Mesa and The Palisade Wilderness Study Areas would be recommended as nonsuitable for wilderness designation.

Off-Road Vehicles. The top of Sewemup Mesa (13,000 acres) and 15 acres of important cultural sites would be closed to vehicle use. The remainder of the emphasis area would be open.

Public Utilities. Approximately 23,825 of peregrine falcon habitat and 15 acres of important cultural sites would be designated sensitive to public utilities.

Transportation. Public access would be acquired into the south end of Sinbad Valley for forestry and recreation management purposes.

Fire. Approximately 51,520 acres would be managed for limited suppression. The remainder of the emphasis area would be managed under full suppression. If sites requiring a higher level of protection were identified, they would be given critical protection designation.

Area Co-2: Emphasis on Oil and Gas

Oil and Gas. Approximately 43,005 acres would be available for leasing with additional stipulations to protect threatened and endangered species. Approximately 2,630 acres would be available for leasing with a no surface occupancy stipulation to protect the Pyramid Rock area of critical environmental concern and Vega Reservoir state recreation area.

Water. Six miles of actively-eroding channels would be treated along Sand Wash and Dry Fork. Sediment and salinity yield would be reduced on approximately 21,000 acres of critically-eroding soils in the Dry Fork, Corcoran Wash, Coon Hollow, lower Roan Creek, and De Beque cutoff areas.

Locatable Minerals. The entire area would be available for mineral location except for those areas closed because of existing withdrawals.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except for those areas closed because of existing withdrawals and 255 acres at Pyramid Rock.

Forestry. Approximately 6,171 acres of productive pinyon-juniper would be identified as suitable for management and harvesting.

Wildlife. The Roan Creek Habitat Management Plan would be revised to place less restrictive stipulations on oil and gas development and to allow wood harvests prior to vegetative manipulation projects in productive woodlands. A high priority would be placed on maintaining riparian habitat. In the Plateau Creek area, water developments and vegetation manipulation projects would be used to improve deer, elk, and bighorn sheep distribution. Sport fisheries would be maintained along 16.5 miles of six streams.

Threatened and Endangered Species. The Uinta Basin hookless cactus (36,500 acres) would be protected from surface-disturbing activities.

Recreation. Approximately 22,500 acres in the South Shale Ridge area would be designated as an intensive recreation management area. Trails would be developed, and unique geologic features would be protected.

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails within the range of the Uinta Basin hookless cactus and the Pyramid Rock area. The Beehive Road would be closed to vehicle use from December 1 to May 1 to protect deer on critical winter range. The South Shale Ridge area (22,500 acres) would be limited to designated roads and trails to protect scenic values. The remainder of the emphasis area would remain open.

Public Utilities. Approximately 36,500 acres containing the threatened and endangered Uinta Basin hookless cactus would be designated sensitive to public utilities.

Transportation. Trail access would be acquired to the Hawxhurst Creek and Silt cutoff areas. Public road access would be acquired to Cow Ridge, Horse Mountain, Brush Mountain, Carr Creek, Roan Creek, Chalk Mountain, Middle North Dry Fork, and Logan Wash. A loop road would be developed between Roan Creek and Douglas Pass.

Fire. Approximately 5,000 acres would be managed for critical fire suppression (oil and gas facilities, improvements, cultural sites, tall conifers), and approximately 170,600 acres would be managed for limited suppression. Approximately 10,000 acres would be managed for prescribed burning.

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Area Co-3: Emphasis on Oil and Gas

Oil and Gas. Approximately 40,640 acres would be available for leasing with additional stipulations to protect threatened and endangered species and the Ladder Springs cultural site. Approximately 640 acres would be available for leasing with a no surface occupancy stipulation to protect two developed recreation sites and a portion of the Grand Junction municipal watershed. All remaining acreage would be leased with standard lease terms.

Locatable Minerals. The entire area would be available for mineral location except for those areas closed because of existing withdrawals.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except for those areas closed because of existing withdrawals and 350 acres for the Indian Creek archaeological site and 5 acres for the Gunnison Gravels.

Forestry. Productive pinyon-juniper woodlands in the area would be identified as suitable for management and harvesting.

Wildlife. A high value would be placed on maintaining riparian habitat. Approximately 670 acres of vegetation would be manipulated to increase winter and early spring forage for deer and elk, and several watering sites would be developed for improved deer, elk, and pronghorn distribution. Approximately 4.3 miles of sport fisheries habitat would be maintained on Northeast, the North Fork of Kannah, and Big Dominguez Creeks.

Threatened and Endangered Species. The black-footed ferret (1,200 acres) and spineless hedgehog (12,800 acres) and Uinta Basin hookless (21,000 acres) cacti would be protected from surface-disturbing activities. Surface-disturbing activities would be prohibited on 8,400 acres from December 1 to April 1 to protect wintering bald eagles.

Recreation. Mud Springs Recreation Site would be managed for both overnight and day-use activities, and day-use facilities would be expanded. Bang's Canyon, the Gunnison River (18,000 acres), and Dominguez Creeks would be designated as intensive recreation management areas. Commercial river permits would be issued on the Gunnison and Dolores Rivers. Trailhead management would be provided at Bridgeport, and boat launch facilities would be improved.

Off-Road Vehicles. Vehicle use would be limited to existing roads and trails in the Bang's Canyon (40,000 acre) and Gunnison River (18,000 acres) Intensive Recreation Management Areas. The Lands End (1,920 acres) chainings would be closed to vehicle use from December 1 to April 30 to protect

deer on critical winter range. Vehicle use would be limited to designated roads and trails in the Indian Creek area to protect cultural values.

Special Management Areas. The Indian Creek archaeological site (350 acres) would be designated as an area of critical environmental concern and managed as a high value site.

Public Utilities. The Indian Creek Area of Critical Environmental Concern (350 acres) would be designated unsuitable for public utilities. The Bang's Canyon Intensive Recreation Management Area (40,000 acres) and potential habitat for black-footed ferrets, bald eagles, and spineless hedgehog and Uinta Basin hookless cacti (35,000 acres) would be designated sensitive to public utilities.

Transportation. Public access would be maintained to Bridgeport, and the area north of Lands End Road for recreation purposes. Public access would be acquired to Indian Creek and from Unaweep Canyon to Little Park.

Fire. Approximately 84,000 acres would be managed for full suppression, and approximately 5,000 acres would be managed for limited suppression.

Areas CoCc: Emphasis on Oil and Gas and Coal

Oil and Gas. Approximately 57,720 acres would be available for leasing with additional stipulations to protect threatened and endangered species and the Palisade municipal watershed. Approximately 80 acres would be available for leasing with a no surface occupancy stipulation to protect the Goblins, a scenic, unique, and sensitive geologic formation. The remainder of the area would be leased with standard lease terms.

Coal. Approximately 350,389 acres would be identified as acceptable for further coal leasing consideration. The Little Book Cliffs and Demaree Canyon Wilderness Study Areas, presently identified as unsuitable based on Coal Unsuitability Criterion 4, are included in this acceptable acreage. The Palisade municipal watershed and the Colorado River corridor would be identified as unsuitable based on Coal Unsuitability Criteria 4 and 17, respectively (see Appendix D). The existing coal leases in the Palisade municipal watershed would be allowed to develop. Stipulations to protect the watershed would be added to the mine plan during the mine approval process. Approximately 162,658 acres would be identified as sensitive to coal development based on Coal Unsuitability Criteria 2, 3, 7, 9, 10, 11, 13, 14, 15, and 19 (see Appendix D). Stipulations would be placed on coal development within these areas to protect the sensitive resources.

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Locatable Minerals. The entire area would be available for mineral location except for those areas closed because of existing withdrawals.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except for those areas closed because of existing withdrawals.

Water. Surface-disturbing activities that would adversely affect water quality and quantity would be prohibited within the Palisade municipal watershed. Sediment and salinity would be reduced on 1,600 acres of critically-eroding saline soils in the upper Big Wash watershed.

Forestry. Approximately 15,924 acres of productive pinyon-juniper would be identified as suitable for management and harvesting. Approximately 600 acres of pinyon-juniper in the following locations would be identified as unsuitable for management and harvesting: Mount Lincoln (264 acres), adverse location; and Corcoran Point (336 acres), fragile soils. Fuelwood sales would be designed to meet wildlife objectives within big game winter range.

Wildlife. Suitable habitat would be provided for the stocking of chukar and sport fish and the relocation of deer and elk. Nonproductive woodland would be manipulated to improve winter forage for deer and elk. Watering sites would be constructed to improve wildlife distribution on deer summer range and in chukar habitat. A high priority would be placed on maintaining the riparian habitat. Approximately 10 miles of sport fishery habitat would be maintained.

Threatened and Endangered Species. Surface facilities would be prohibited within the Colorado River riparian zone without prior approval of the BLM authorized representative (see Appendix D).

Recreation. Two roadside stops would be provided in Prairie Canyon, two in West Salt Creek, two in Barrel Springs, two in Big Salt Wash, and one on Mitchell Road.

Off-Road Vehicles. Vehicle use would be limited to existing roads and trails in the Goblins (80 acres) and to designated existing roads and trails in the Baxter/Douglas Pass Area of Critical Environmental Concern (18,000 acres). Vehicle use would be prohibited in the Palisade municipal watershed. The remainder of the area would be identified as open.

Wilderness. Demaree Canyon Wilderness Study Area would be recommended as nonsuitable for wilderness.

Special Management Areas. Approximately 18,000 acres of soil slumping in the Baxter/Douglas Pass area would be designated as an area of critical environmental concern.

Public Utilities. The Goblins (80 acres) would be designated unsuitable for public utilities. The Palisade municipal watershed (4,600 acres), threatened and endangered species habitat (34,720 acres), the Transect 7 area (9,000 acres), Plateau Creek and Baxter/Douglas Pass soil slumps (18,860 acres), and the Mount Garfield cliffs (7,000 acres) would be designated sensitive for public utilities.

Transportation. Public access would be acquired into Barrel Springs/Upper Salt Creek, Bunker Road west from Baxter Pass Road, Prairie Canyon, Baxter Pass to Douglas Pass, Divide Road east of Douglas Pass to the Roan Creek area, Upper Big Salt Wash, 4A Mountain, and South Canyon.

Fire. Approximately 25,000 acres would be managed for critical fire suppression; approximately 365,880 acres would be managed for limited suppression areas; and approximately 15,000 acres would be managed for prescribed burning.

Areas Co/Ee/Ep: Emphasis on Oil and Gas and Wild Horses

Oil and Gas. Approximately 9,150 acres would be available for leasing with additional stipulations to protect peregrine falcon habitat and wild horse foaling and winter range. All remaining acreage would be available for lease with standard lease terms.

Locatable Minerals. The entire area would be open to mineral location.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits.

Wild Horses. The Little Book Cliffs Wild Horse Range would be managed to support 65 to 120 horses. The area would be expanded from 27,881 acres to 30,261 acres—an addition of 2,380 acres.

Water. Measures would be taken to reduce sediment yield on approximately 3,600 acres of critically-eroding soils in Jerry Gulch and Coal Canyon.

Coal. Approximately 30,261 acres would be identified as acceptable for further leasing consideration pending further study.

Forestry. Approximately 6,639 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Fuelwood sales would be limited to commercial operators only. Fuelwood sales would also be limited to 30 acres or less and would be designed to meet management objectives for wild horses.

Wildlife. A high priority would be placed on maintaining riparian habitat, particularly in Cottonwood Creek.

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Threatened and Endangered Species. Surface-disturbing and human activities would be prohibited from February 13 to July 1 within one-quarter mile of active peregrine falcon nests.

Off-Road Vehicles. Coal Canyon (6,500 acres) would be closed to vehicle use from March 1 to June 30 (during the foaling season) and limited to existing roads and trails during the rest of the year. The remainder of the emphasis area would be limited to existing roads and trails year-round. All new roads constructed for resource management purposes in the wild horse area would be closed to the general public.

Wilderness. The Little Book Cliffs Wilderness Study Area would be recommended as nonsuitable for wilderness.

Land Tenure. Approximately 966 acres of private land would be identified for acquisition in the Little Book Cliffs Wild Horse Range.

Transportation. New roads to oil and gas drill sites in the wild horse range would be closed upon abandonment of the sites.

Public Utilities. Approximately 30,150 acres would be designated as sensitive to public utilities.

Fire. Approximately 28,261 acres would be managed for full suppression, and 2,000 acres would be managed for prescribed burning.

Area CoJo: Emphasis on Oil and Gas and Off-Road Vehicles

Oil and Gas. Approximately 21,338 acres would be available for leasing with additional stipulations to protect threatened and endangered species and two cultural sites. Approximately 6,015 acres would be available for leasing with a no surface occupancy stipulation to protect the Badger Wash hydrologic study area, Indian Wash dam, the Fruita Paleontological Site, Skipper's Island, and two developed recreation areas and an endangered and threatened plant species. All remaining acreage would be available for leasing with standard lease terms.

Off-Road Vehicles. Vehicle use would be limited to existing roads and trails in the Coal Canyon area and to designated roads and trails in Rabbit Valley, 280 acres (paleontological values), Cactus park, 1,800 acres (soils). The Fruita Paleontological Site and Skipper's Island would be closed to vehicle use. About 100,000 acres between Mount Garfield and the Utah stateline would be identified as suitable for competitive off-road vehicle events. Staging areas for other off-road vehicle events would be encouraged immediately east of 27-1/4 Road.

Water. The effects of surface-disturbing activities in the Badger Wash hydrologic study area would

continue to be studied. About 35 miles of actively-eroding stream channels would be treated along Hunter Wash, Big Salt Wash, East Salt Creek, and in the Rough Canyon area. Measures would be taken to reduce sediment yield and salinity on approximately 164,000 acres of critically-eroding saline soils in the Grand Valley and Rough Canyon area. Maintenance of existing structures would continue in Leach Creek and Indian Wash.

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except 2,045 acres would be closed in Badger Wash hydrologic study area, Cactus Park Area of Critical Environmental Concern, and Fruita and Rabbit Valley paleontological sites.

Forestry. Approximately 1,654 acres of productive pinyon-juniper would be identified as suitable for management and harvesting.

Wildlife. A high priority would be placed on maintaining riparian habitat. Winter and early spring forage for deer would be improved. Watering sites would be developed to improve distribution of chukar, waterfowl, and pronghorn. Approximately 1.5 miles of Northeast Creek would be maintained as sport fish habitat.

Threatened and Endangered Species. Approximately 20,288 acres would be identified as potential black-footed ferret range.

Recreation. Conflicting uses in the desert would be supervised to reduce conflicts. A rest stop would be developed on Skipper's Island in cooperation with the Colorado Division of Highways. The following sites would be identified as group use areas: Cactus Park (2,560 acres), Little Park Road (7,700 acres), Whitewater Hill (10,900 acres), Rabbit Valley (10,900 acres), 27-1/4 Road and 29 Road (25,000 acres), lower Unaweep Canyon (15,100 acres), and Snook's Bottom (2,000 acres).

Special Management Areas. Approximately 800 acres in upper Cactus Park would be designated as an area of critical environmental concern to protect highly erosive soils. Skipper's Island (160 acres) would be identified as an area of critical environmental concern to protect bald eagle winter habitat and a significant stand of riparian habitat.

Public Utilities. The Badger Wash hydrologic study area (685 acres), Fruita Paleontological Site (280 acres), and Skipper's Island (160 acres) would be designated unsuitable for public utilities. Island Acres (80 acres), Highline Reservoir (1,100 acres), threatened and endangered species habitat (14,778

Commodity Alternative

acres), and Cactus Park (800 acres) would be designated sensitive for public utilities.

Transportation. Trail access would be acquired through the Carpenter Townsite. The Adobe Trail and Mitchell Road would be upgraded to accommodate passenger cars. Public access would be acquired to Snyder Flats South, McDonald Creek, Horse Mountain near Palisade, 29 Road, 33 Road, and Cactus Park. Administrative access would be acquired on Snyder Flats North for forest management.

Land Tenure. When an application is submitted, the BLM would work with the Federal Aviation Administration and the Walker Field Airport Authority on the potential airport expansion involving approximately 2,240 acres of public land.

Fire. Approximately 2,000 acres would be managed for critical fire suppression (oil and gas facilities, improvements, coal outcrops, and Skipper's Island area), and the remaining 146,000 acres would be managed for full suppression.

Area F: Emphasis on Water

Water Resources. Management of this area is discussed in Emphasis Area CoCC.

Areas Gd: Emphasis on Land Disposal

Land Disposal. A total of 207 tracts containing approximately 41,550 acres would be identified for disposal. Prior to disposal, the resources within these tracts would be managed as described under this emphasis area. Little, if any, funds would be spent for on-the-ground improvements for resource management on these tracts. The town of Palisade would be consulted about disposal of any public land tracts within the Palisade municipal watershed prior to disposal. Mineral estates would be conveyed with the surface where mineral values are known not to exist or where retaining the mineral rights would interfere with or preclude nonmineral development of the land which is a more beneficial use of the land than mineral development.

Locatable Minerals. All potential disposal tracts would remain open to mineral location unless previously withdrawn from the general mining laws.

Coal. Any potential disposal tracts that are within the potential coal development area would be acceptable for further coal leasing consideration.

Oil and Gas. The entire area would be available for leasing with standard lease terms.

Mineral Materials. Potential disposal tracts would be identified as open to mineral materials

sales or free use permits except for those areas closed because of existing withdrawals.

Forestry. Sawtimber and fuelwood harvesting would be allowed to continue pending disposal.

Livestock Grazing. Limited management of range would occur on all land identified for disposal. There would be no new range projects or studies initiated on these areas. Where the sale would necessitate adjustment of the grazing permit, the permittees would be notified 2 years prior to selling the grazing land.

Recreation. Recreation would not be managed in areas identified for disposal.

Off-Road Vehicles. This area would be designated as open to off-road vehicle use.

Visual Resources. No visual resource management objectives would be adopted.

Public Utilities. All tracts would be designated sensitive to public utilities. Only right-of-way applications that would not unduly depreciate the tracts' appraised values would be approved.

Transportation. No additional access would be acquired specifically for management of these tracts. Public access would be reserved across those tracts where it would benefit the public.

Fire. The entire emphasis area would be managed as a full suppression area.

Areas Hp: Emphasis on Forest Management

Forestry. Productive pinyon-juniper woodlands in the area would be identified as suitable for woodland management and harvesting except for approximately 2,622 acres in the following locations which would be identified as unsuitable for management: The Falls area (15 acres), recreation; Black Ridge (1,855 acres), adverse location; Pinyon Mesa (673 acres), adverse location; and Gibbler Mountain (79 acres), adverse location. All timber sales would be designed to enhance or protect wildlife habitat.

Water. Measures would be taken to reduce sediment yield on approximately 2,400 acres of critically-eroding soils in Little Dominguez Canyon.

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Mineral Materials. The entire area would be open to mineral materials sales or free use permits except for those areas closed because of existing withdrawals and 37 acres closed at Unaweep Seep.

Oil and Gas. Approximately 30,816 acres would be available for leasing with additional stipulations

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to protect threatened and endangered species and the Sieber Canyon cultural site. Eighty acres would be available for leasing with a no surface occupancy stipulation to protect two developed recreation sites. All remaining acreage would be available for leasing with standard lease terms.

Wildlife. A high priority would be placed on maintaining riparian habitat. Vegetation manipulation projects would be used to increase deer, elk, and bighorn sheep forage on nonproductive woodlands and nonforested areas. Watering sites would be developed to improve distribution of big game. Suitable habitat would be provided for the reintroduction of bighorn sheep and the stocking of trout. Oil and gas exploration and development would be prohibited in bighorn sheep concentration areas from December 1 to May 1. Sport fisheries would be maintained along 14.6 miles of 5 streams.

Threatened and Endangered Species. The spineless hedgehog cactus (19,000 acres) would be protected from surface-disturbing activities. Disturbing activities would be prohibited within one-quarter mile of active peregrine falcon nests (1,600 acres) from February 15 to July 15.

Recreation. The Black Ridge/Ruby Canyon area would be designated as an intensive recreation management area (see also Emphasis Area Ou). The Black Ridge area would be managed for back-country recreation and trail-oriented vehicle use. Bang's Canyon (40,000 acres) and Granite Creek (15,000 acres) areas would be designated as intensive recreation management areas (see also Emphasis Area Co-3). The Palisade would be designated as an intensive recreation management area (see also Emphasis Area Co-1). The Little Dolores Falls and Dominguez Recreation Sites would continue to be managed, and the Dominguez Recreation Site would be improved.

Off-Road Vehicles. Vehicle use would be limited to existing roads and trails within the Black Ridge/Ruby Canyon, Granite Creek, and Bang's Canyon intensive recreation management areas.

Public Utilities. The following areas would be designated sensitive to public utilities: the bighorn sheep range (9,916 acres), peregrine falcon nest sites (1,600 acres), spineless hedgehog cactus range (19,000 acres), the Little Dolores Falls (40 acres) and Dominguez (40 acres) Recreation Sites, Black Ridge/Ruby Canyon Intensive Recreation Management Area (68,000 acres), Granite Creek Intensive Recreation Management Area (15,000 acres), Bang's Canyon Intensive Recreation Management Area (40,000 acres), and The Palisade Intensive Recreation Management Area (26,000 acres).

Transportation. Public access would be acquired into the Timber Ridge and Coates Creek areas for forest management purposes.

Fire. Approximately 30,000 acres would be managed for full suppression (commercial timber, firewood, and recreation sites). Approximately 49,441 acres would be managed for limited suppression, and approximately 5,000 acres would be managed for prescribed burning.

Areas Ou/Oa: Emphasis on Wildlife

Wildlife. A high priority would be placed on maintaining riparian habitat. Pinyon-juniper and mountain shrub would be manipulated to improve the cover/forage ratio for deer, elk, and wild turkey. Watering sites would be developed for improved distribution of game species. Disturbing activities such as oil and gas exploration would not be permitted in the bighorn sheep area (12,000 acres) and in critical deer and elk winter range from December 1 to May 1 and in elk calving areas (2,200 acres) from May 15 to June 11. Suitable habitat would be provided for the reintroduction of bighorn sheep and chukar. Sport fisheries would be maintained along 35 miles of 8 streams.

Water. Measures would be taken to reduce sediment yield on about 900 acres of critically-eroding watershed in Snyder Canyon.

Oil and Gas. Approximately 127,284 acres would be available for leasing with additional stipulations to protect threatened and endangered species, deer and elk winter range, elk calving areas, and bighorn sheep range. Approximately 37 acres would be available for leasing with a no surface occupancy stipulation to protect the Unaweep Seep special management area. All remaining acreage would be available for lease with standard lease terms.

Paleontological Resources. The Fruita Paleontological Site would be managed as outlined in the existing management plan which emphasizes scientific research and protection of fossils.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Forest management and activity plans would be designed to enhance wildlife values.

Threatened and Endangered Species. The spineless hedgehog cactus and Uinta Basin hookless cactus would be protected from surface-disturbing activities. Surface-disturbing activities would be prohibited within one-quarter mile of active peregrine falcon nests (2,900 acres). Surface disturbance would be prohibited on 3,500 acres of bald eagle habitat along the south side of the Colorado

Protection Alternative

River from December 1 to April 1. Suitable habitat in the Colorado River would be provided for restocking of the humpback chub, Colorado River squawfish, razorback sucker, and bonytail chub.

Cultural Resources. The Ladder Springs archaeological sites would be identified for active management as high value cultural sites.

Recreation. The Black Ridge/Ruby Canyon area, including the portion in Utah (73,000 acres), and the Dominguez Creeks area (12,000 acres) would be designated as intensive recreation management areas. The Miracle Rock Recreation Site would be managed for day use. Signs would be placed at five public access points in Unaweep Canyon. The Snyder Flats Trail would be improved for horse use. A trail and trailhead would be developed in North Creek. The West Creek Roadside Stop would be improved. An additional roadside stop would be developed along West Creek. The Gunnison River and Bang's Canyon would be designated as intensive recreation management areas (see also Emphasis Area Co-3). A trailhead would be developed at the bottom of Pollack Canyon. Commercial river permits would continue to be issued in Ruby Canyon; the Gibson and Black Rocks Trails would be developed for hiking access into Ruby Canyon. Big and Little Dominguez Creeks would be managed for backcountry use where not in conflict with wildlife and forestry goals.

Off-Road Vehicles. The Fruita Paleontological Site would be closed to vehicle use (280 acres). Vehicle use in the Black Ridge area would be limited to existing roads and trails (68,000 acres). Vehicle use in Dominguez Creeks Intensive Recreation Management Area (12,000 acres) and the lower portions of Devil's, Pollack, and Flume Canyons (11,500 acres) would be limited to designated roads and trails. The remainder of the area would be designated as open to vehicle use.

Wilderness. Black Ridge Canyons and Dominguez Canyon Wilderness Study Areas would be recommended as nonsuitable for wilderness designation.

Special Management Areas. The Unaweep Seep (37 acres of public land) would continue to be managed as a research natural area according to the existing management plan.

Land Tenure. An 80-acre parcel of private land in the Unaweep Seep area and the 3-acre Loma Launch Site would be identified for acquisition.

Public Utilities. The Fruita Paleontological Site (280 acres) and Unaweep Seep (37 acres) would be designated unsuitable for public utilities. Peregrine falcon nest habitat (2,800 acres), the spineless hedgehog cactus range (26,132 acres), Black Ridge/Ruby Canyon, and Dominguez Creeks

(88,000 acres) would be designated sensitive for public utilities.

Transportation. The Snyder Flats trail would be improved for horses. Trail access would be acquired in the bottom of Devil's, Flume, and Pollack Canyons. Legal access would be acquired to the Black Ridge Trail. Public access would be acquired along the lower Little Dolores River. Administrative access would be acquired to the Crawford Peak communication site.

Fire. Approximately 149,774 acres would be managed for full suppression, and approximately 600 acres would be managed for prescribed burning.

PROTECTION ALTERNATIVE (MAP 4)

Areas A-1: Emphasis on Recreation

Recreation. The area (approximately 22,500 acres) would be identified as an extensive outdoor recreation management area and managed to maintain opportunities for semi-primitive non-motorized recreation. The area would be withdrawn from mineral entry.

Water. Approximately 9,700 acres on South Shale Ridge north of Sulphur Gulch would be managed to treat critically-eroding soils.

Locatable Minerals. The area would be closed to mineral location.

Coal. The area would be unacceptable for further coal leasing consideration because of the recreation withdrawal (Appendix D, Multiple Land Use Tradeoffs.)

Oil and Gas. The area would be available for oil and gas leasing with the no surface occupancy stipulation to protect the recreation and visual resource values.

Mineral Materials. The area would be closed to mineral materials sales and free use permits.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Fuelwood and sawtimber sales would be designed to minimize their visual impacts and to meet visual resource management Class II objectives.

Wildlife. The Roan Creek Habitat Management Plan would be modified to include temporary public access to pinyon-juniper manipulation areas for wood harvesting. Surface-disturbing activities would be prohibited in critical deer winter range and migration routes from December 1 to May 1.

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Threatened and Endangered Species. The Uinta Basin hookless cactus would be protected from surface-disturbing activities. Known locations of sensitive species would be protected from surface disturbance.

Off-Road Vehicles. Approximately 7,165 acres of critical deer winter range and migration routes would be closed to vehicle use from December 1 to May 1 and limited to designated roads and trails from May 2 to November 30. The remainder of the emphasis area would be limited to designated roads and trails year-round.

Visual Resources. The entire area would be managed according to visual resource management Class II objectives.

Special Management Areas. South Shale Ridge would be designated as an area of critical environmental concern to protect scenic and unique geologic features.

Public Utilities. The area would be designated unsuitable for public utilities.

Transportation. Public access would be acquired along Corcoran Wash.

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas A-2: Emphasis on Recreation

Recreation. Hunter/Garvey Canyons area would be designated as an intensive recreation management area and managed to provide for backcountry recreation. Opportunities for semi-primitive motorized and semi-primitive non-motorized recreation would continue. Surface-disturbing activities would be restricted to protect the area's natural values.

Locatables. The entire area would be closed to mineral location.

Coal. The area would be identified as unacceptable for further coal leasing consideration based on multiple land use tradeoffs (see Appendix D).

Oil and Gas. The area would be available for leasing with the no surface occupancy stipulation to protect the recreation and visual resource values.

Mineral Materials. The area would be closed to mineral materials sales and free use permits.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting with the stipulation that 30 percent of all trees 10 inches in diameter and larger within sale areas be retained to maintain stand diversity and to minimize the visual impacts associated with harvesting.

Wildlife. Fruit-productive mountain shrub stands would be excluded from vegetation manipulations that would reduce their value to fruit-dependent wildlife. Roads would be closed where they no longer serve their primary purpose and have relatively little value to multiple use management. Also, average road density would not be allowed to exceed 2 miles of road per square mile.

Threatened and Endangered Species. Surface-disturbing and human activities would be prohibited within one-quarter mile of active golden eagle and prairie falcon nests from January 15 to July 15 and February 15 to July 15, respectively.

Off-Road Vehicles. The area would be limited to designated roads and trails.

Visual Resources. The area would be managed under visual resource management Class II objectives.

Public Utilities. The entire area would be designated unsuitable for public utilities.

Transportation. Public hiking access would be acquired through Hunter Canyon.

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas A-3: Emphasis on Recreation

Recreation. Granite Creek would be designated as an intensive recreation management area (15,000 acres). The existing semi-primitive motorized recreational opportunities and unusual geologic, cultural, and other resource values would be maintained. Backcountry use would be promoted.

Water. The Sinbad Valley salinity control project would continue to be studied in cooperation with the U.S. Bureau of Reclamation.

Locatable Minerals. The entire area would be closed to mineral location.

Oil and Gas. All acreage would be available for leasing with the no surface occupancy stipulation to protect visual and recreation resource values.

Mineral Materials. The entire area would be closed to mineral materials sales or free use permits.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting with the stipulation that 30 percent of all trees 10 inches in diameter or larger within sale areas be retained to maintain stand diversity and to minimize the visual impacts associated with harvesting.

Protection Alternative

Wildlife. Wildlife would be managed primarily for the habitat of grouse, peregrine falcon, deer and elk. Disturbing activities would not be permitted in deer and elk critical winter ranges from December 1 to May 1 and in elk calving areas from May 15 to June 15. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Sport fisheries would be maintained along 7.3 miles of two streams.

Threatened and Endangered Species. Disturbing activities would be kept beyond one-quarter mile of active peregrine falcon nests. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities.

Off-Road Vehicles. Vehicles would be limited to designated roads and trails in Sinbad Valley and to existing roads and trails in the remainder of the area.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. The Sinbad Valley historic unit project, including a Class III block survey, would be actively managed.

Visual Resources. The Cliffs in Sinbad Valley would be identified as visual resource management Class I (3,840 acres). Visual resource management inventory classes would be adopted as the visual resource management objectives in Sinbad Valley and Granite Creek. Surface occupancy for oil and gas development and other facilities would be prohibited on visual resource management Class I areas.

Public Utilities. The visual resource management Class I areas (3,840 acres) would be designated unsuitable for public utilities. The remainder of the area would be designated sensitive for public utilities.

Transportation. Administrative access would be acquired up the Little Dolores River for wildlife and range management. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas A-4: Emphasis on Recreation

Recreation. The Bang's Canyon/Northeast Creek area would be designated as an intensive recreation management area (40,000 acres). Boating permits would be issued for commercial use of the Gunnison River. Backcountry hiking and vehicle travel would be promoted on trails through the use of signing, brochures, and contact with visitor services personnel. The existing semi-primitive motorized and semi-primitive non-motorized recreational opportunities would be maintained. The collection of down and dead wood would be permitted for campfires only. Little Park, Cactus Park, and lower Unaweep Canyon would be identified as group use areas within the Grand Valley Intensive Recreation Management Area.

Water. Salt and sediment yield would be reduced on 8,600 acres in the Rough Canyon area and on 1,500 acres in the Cactus Park area. Approximately 11 miles of actively-eroding stream channels would be treated in the Rough Canyon and Cactus Park areas.

Locatable Minerals. Approximately 40,000 acres would be closed to mineral location.

Oil and Gas. The area would be available for leasing with the no surface occupancy stipulation to protect visual and recreation resource values.

Mineral Materials. Approximately 40,000 acres would be closed to mineral materials sales or free use permits.

Forestry. Approximately 12,451 acres of productive pinyon-juniper woodlands and 944 acres of commercial forest land would be identified as unsuitable for management and harvesting, other than to control insects and diseases, in order to maintain the primitive setting.

Wildlife. Wildlife would be managed primarily for the habitat of the several unique canyon-mesa species present. Forage improvement projects would be used to attract more deer and elk of the Glade Park area to winter here. Disturbing activities would be prohibited in deer critical winter ranges from December 1 to May 1. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Sport fish habitat would be protected along 3.5 miles of Northeast Creek.

Threatened and Endangered Species. The bald eagle and spineless hedgehog cactus would be protected from disturbing activities. Known important habitat sites of sensitive plant and animal

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species would be protected from disturbing activities.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. Cactus Park would be actively managed as a high value cultural resource area.

Visual Resources. The visual resource management classes identified through the visual resource management inventory would be adopted as the visual resource management objective for this area.

Special Management Areas. Rough Canyon (1,470 acres) and a portion of upper Cactus Park (1,500 acres) would be designated as an area of critical environmental concern to protect cultural values, critically-eroding soils and reduce sediment yield.

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails in the Bang's Canyon Intensive Recreation Management Area (40,000 acres) and in the Cactus Park Area of Critical Environmental Concern (1,500 acres) and to existing roads and trails in the remainder of the area.

Public Utilities. The Bang's Canyon Intensive Recreation Management Area (40,000 acres) and the Cactus Park Area of Critical Environmental Concern (1,500 acres) would be designated sensitive for public utilities.

Transportation. Public access would be acquired from Unaweep Canyon to Little Park and Cactus Park. Administrative access would be acquired along Snyder Flats South. Access would be maintained to Sieber Canyon and Knowle's Canyon via BS Road.

Fire. Approximately 1,500 acres would be managed as critical suppression areas; approximately 14,260 acres would be managed as full suppression areas; and approximately 26,240 acres would be managed as limited suppression areas.

Areas A-5: Emphasis on Recreation

Recreation. The entire area would be managed to protect outstanding scenery and to maintain and the semi-primitive motorized recreational opportunities. Noticeable modifications in the characteristic landscape would not be permitted. Ruby Canyon would be managed to protect scenic river values. Permits would be required for commercial boating. Motorboats would be permitted to land on either side of the river. Wood gathering would only be allowed for dead and down wood and for immediate campfire purposes only. Campfire locations would be limited to prevent wildfires.

Locatable Minerals. Ruby Canyon would be closed to mineral location.

Oil and Gas. The area would be available for leasing with the no surface occupancy stipulation to protect visual and recreation resource values.

Mineral Materials. The area would be closed to mineral materials sales and free use permits.

Wildlife. Wildlife would be managed primarily for the habitat of four endemic river fish, bald eagles, and other riparian species. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings.

Threatened and Endangered Species. Suitable habitat would be provided for the reintroduction of peregrine falcon, nesting bald eagles, and bony-tailed chub. Disturbing activities would not be permitted between December 1 to April 1 to protect wintering bald eagles and between February 15 to July 15 within one-quarter mile of active prairie and peregrine falcon nests. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

Visual Resource Management. The area would be managed to meet visual resource management Class I objectives.

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails.

Land Tenure. Approximately 3 acres at the Loma launch site and 150 acres in Crow Bottom would be identified for acquisition.

Public Utilities. The entire emphasis area would be designated unsuitable for public utilities.

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas Dp: Emphasis on Wilderness

Wilderness. All seven wilderness study areas, totalling 252,555 acres, would be recommended to Congress as suitable for wilderness designation pending mineral reports. The boundaries of Demaree Canyon, Little Book Cliffs, Black Ridge Canyons, Black Ridge Canyons West, The Palisade, and Dominguez Canyon Wilderness Study Areas would be modified as shown in Appendix I.

Air Quality. Designated wilderness areas would be managed as Class II unless they are reclassified

Protection Alternative

by the state as a result of the procedures prescribed in the Clean Air Act (as amended, 1977).

Water. Watersheds would be restored only where deteriorated soil and hydrologic conditions threaten life, property, or loss of wilderness values and where natural recovery would be unlikely. New or expanded water developments would be allowed only when approved by the President. Existing water structures would be maintained if in the public interest or if they have a valid existing rights. Primitive means of access and hand tools would be used wherever and whenever feasible for maintenance of reservoirs. Water quality would be maintained or enhanced consistent with the protection of wilderness values.

Locatable Minerals. All wilderness areas would be closed to mineral location except for pre-Federal Land Policy and Management Act claims determined to have valid discoveries.

Coal. About 22,420 acres in Demaree Canyon and 26,666 acres in the Little Book Cliffs Wilderness Study Areas would be identified as unsuitable for further coal leasing consideration. Existing leases within these areas would be allowed to develop subject to valid existing rights.

Oil and Gas. All wilderness areas would be closed to additional oil and gas leasing. Any existing oil and gas leases issued prior to the passage of the Federal Land Policy and Management Act (FLPMA) of 1976 would be allowed to develop subject to the unnecessary or undue degradation standard if nonimpairment could not be met. (Appendix E describes management of a typical oil and gas well.)

Eight pending applications for permit to drill (APDs) within the Little Book Cliffs Wilderness Study Area, one within the wild horse range, and one adjacent to both areas would be approved. A previous decision to approve these APDs was appealed but was remanded to BLM for further environmental analysis (see Appendix E). The impacts of developing pre-FLPMA leases in wilderness study areas are described in the Environmental Consequences, Chapter 4. Appendix E describes BLM's responsibilities regarding leases in WSAs and presents an analysis of the ten pending APDs. Existing leases issued after the passage of FLPMA would not be allowed to be developed, unless development would be nonimpairing to wilderness characteristics.

Mineral Materials. All wilderness areas would be identified as closed to mineral materials sales and free use permits.

Forestry. Approximately 29,335 acres of productive pinyon-juniper woodlands and 546 acres of commercial forest land would be identified as un-

suitable for management and harvesting other than to control insects and disease.

Wildlife. Wildlife habitat would be managed so as not to conflict with wilderness values and would seek a natural distribution and number of native species. Hunting, fishing, and trapping would be allowed, but commercial trapping would be prohibited. Suitable habitat would be provided for the re-introduction of bighorn sheep. The Unaweep Seep Natural Area would continue to be managed as outlined in the habitat management plan.

Threatened and Endangered Species. Research would be permitted consistent with the protection of wilderness values. Suitable habitat would be provided for the relocation of peregrine falcon.

Livestock Grazing. Livestock grazing would continue at levels authorized prior to wilderness designation in accordance with Section 4(d)(4)(2) of the Wilderness Act. Maintenance of existing facilities would be allowed as well as construction of new improvements which are consistent with approved allotment management plans and/or which are necessary for protection of the range. Where practical alternatives (such as horseback) do not exist, maintenance or other activities may be accomplished through the occasional use of motorized equipment such as backhoes to maintain stock ponds, pickup trucks for major fence repair or special equipment to repair stock watering facilities.

Wild Horses. Wild horses would be managed so as not to conflict with wilderness values. Herd numbers and management techniques would be compatible with the preservation of wilderness characteristics. The wild horse management plan would be modified accordingly. Use of motorized equipment would be allowed when no other alternatives exist; it is the minimum necessary to accomplish the task and it is the least degrading to wilderness values. The use of motorized or mechanical equipment requires review and approval by the BLM Colorado State Director. These uses, location, frequency and timing must be specifically addressed in the wild horse and wilderness management plans.

Recreation. Visitor use would be limited to that necessary to provide for use of the area and still preserve wilderness values. The number of facilities, improvements, and signs would be limited to that necessary to protect wilderness resources or to provide for the health and safety of visitors. A trailhead would be developed in Sinbad Valley to direct use into Sewemup Mesa. In the Black Ridge area, motorized boats would be allowed to land on the south side of Ruby Canyon, recreation permits would be issued for commercial recreational uses, and trailheads would be developed at Pollack, Rattlesnake, and the head of Knowle's Canyons. Trail-

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heads would be developed at Bridgeport, Dominguez Recreation Site, and Gunnison Gulch to serve the Dominguez Creeks area.

Off-Road Vehicles. All areas would be closed to vehicle use except for vehicle travel associated with development of pre-FLPMA leases.

Visual Resources. All areas would be managed under visual resource management Class I objectives.

Land Tenure. Approximately 320 acres of private land and 600 acres of state land would be identified for acquisition in the Dominguez Creeks area. Approximately 640 acres at the mouth of Devil's Canyon would be identified for acquisition in the Black Ridge Canyons area.

Public Utilities. All areas would be designated unsuitable for major public utilities. A small utility corridor (860 acres) to serve Glade Park between Black Ridge and Colorado National Monument would be designated suitable for water, telephone, and power distribution lines.

Transportation. Roads would be permitted only where subject to valid existing rights or specifically provided for in the wilderness management plan. Hiking and horse trails would be maintained to preserve wilderness values. Legal foot access would be maintained at Bridgeport to serve Dominguez Canyon. Administrative access would be provided to Star Mesa. Public trail access would be acquired along Little Dominguez Creek if private lands could not be acquired. Public trail access would be acquired in Bull Draw and the North Fork of West Creek in The Palisade area. Public road access would be acquired on the southwest side of Sewmup Mesa. In the Black Ridge area, public access would be maintained on BS Road. Administrative access would be allowed in areas such as Colorado Ridge and the Bench Road. Public trail access would be acquired over the Pollack Trail. Administrative access to Devil's Canyon would be acquired.

Fire. Approximately 3,000 acres would be managed for critical fire suppression. These acres contain scattered oil and gas facilities and coal outcrops in Demaree Canyon and Little Book Cliffs WSA locations. The remainder of this area (249,555 acres) would be managed for wilderness fire activity.

Areas DpEe/Ep: Emphasis on Wild Horses and Wilderness

Wild Horses. Wild horses within the boundaries of the Little Book Cliffs Wilderness Study Area (approximately 19,000 acres) would be managed so as not to conflict with wilderness values (see also Areas Dp). The wild horses outside the WSA would

be managed as outlined in the Wild Horse Management Plan. The total area would be managed to provide habitat for 65 to 120 wild horses.

Locatable Minerals. The area within the WSA would be closed to mineral location except for pre-FLPMA claims determined to have valid discoveries. The remainder of the area would be closed also.

Coal. The portion within the Little Book Cliffs Wilderness Study Area and Little Book Cliffs Wild Horse Range would be identified as unsuitable for further coal leasing consideration based on multiple use conflicts (see Appendix D). Existing coal leases would be allowed to develop.

Oil and Gas. The wilderness study area would be closed to future oil and gas leasing pending formal designation of the wilderness area by Congress. Drilling and development of leases issued prior to the passage of the Federal Land Policy and Management Act (FLPMA) of 1976 would be permitted, subject to the unnecessary or undue degradation standard if nonimpairment could not be met. Eight pending applications for permit to drill (APDs) on pre-FLPMA leases would be approved. Appendix E discusses the development of pre-FLPMA leases in WSAs.

All pre-FLPMA oil and gas wells would be developed as described for a typical well in Appendix E. The following special stipulations would be added to permits to drill pre-FLPMA leases: Exploration and development would be prohibited in Coal Canyon from March 1 to July 1 and in the remainder of the emphasis area from December 1 to May 1 to protect foaling horses and wintering wildlife. Oil and gas reserve pits would be drained and recontoured within 60 days after well completion. The riparian area in Cottonwood Creek would be protected from roads and facilities. The area outside the WSA would be available for leasing with the No Surface Occupancy stipulation to protect the wild horses.

Mineral Materials. The entire area would be closed to mineral materials sales and free use permits.

Forestry. Forest management within the WSA would be the same as Emphasis Area Dp. Productive pinyon-juniper woodlands in the remainder of the area would be identified as suitable for management and harvesting. Fuelwood sales would be limited to commercial operators only. Fuelwood sales would also be limited to 30 acres or less and would be designed to meet management objectives for wild horses.

Wildlife. The area would be managed to provide habitat for deer critical winter range.

Protection Alternative

Threatened and Endangered Species. The potential for peregrine falcons to reoccupy the recently vacated site would be maintained.

Livestock Grazing. Livestock grazing would continue to be prohibited.

Recreation. The area inside the WSA would be managed as described for Emphasis Area Dp. The remainder of the area would be managed as an extensive recreation management area. Hiking trails would be maintained, and a trailhead would be developed for Carpenter Trail.

Off-Road Vehicles. The portion of the wild horse range within the WSA would be closed to vehicle use. Vehicle use in the remainder of the area would be limited to designated roads and trails except that Coal Canyon (6,500 acres) would be closed from December 1 to June 30.

Visual Resources. The WSA would be managed under Class I objectives. The remainder of the emphasis area would be managed under VRM Class III.

Wilderness. The portion of the wild horse range within the Little Book Cliffs Wilderness Study Area would be recommended to Congress as suitable for wilderness designation. (Note: Because of existing pre-FLPMA oil and gas leases, wilderness characteristics in this WSA may be impaired prior to Congressional action.) Following Congressional action, the wilderness study area would be managed as described under Emphasis Area Dp.

Land Tenure. Approximately 966 acres of private land would be identified for acquisition.

Public Utilities. The entire area would be designated unsuitable for public utilities.

Transportation. Hiking and horse trail access would be acquired on the Adobe and Carpenter Trails.

Fire. Approximately 1,500 acres of land adjacent to oil and gas facilities and coal outcrops would be managed for critical fire suppression. Of the remainder, approximately 9,795 acres would be managed for limited fire suppression, and 18,000 acres would be managed for wilderness fire activities.

Area F: Emphasis on Water

Water. The Indian Wash and Leach Creek areas would be managed to reduce salinity and sediment. Approximately 3,300 acres in the Blue and Calamity Creek areas would be managed to reduce sediment yield. Approximately 5 miles of actively-eroding stream channel would be treated along Blue and Calamity Creeks.

Coal. The Palisade municipal watershed would be identified as unsuitable for further coal leasing consideration. Existing coal leases in the Palisade municipal watershed would be allowed to develop.

Oil and Gas. The area would be available for leasing with special stipulations to protect watershed values. (Special stipulations are listed in Appendix E.) Lands without other resource concerns would be leased with standard lease terms.

Locatable Minerals. The entire area would be open to mineral location except for existing withdrawals.

Mineral Materials. The area would be open to mineral materials sales and free use permits with 685 acres closed in the Badger Wash hydrologic study area and 14,000 acres closed in the Palisade municipal watershed.

Forestry. Approximately 805 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Fuelwood and sawtimber harvesting would be restricted within 200 feet of perennial streams.

Wildlife. Wildlife would be managed primarily for the habitat of deer. Disturbing activities would be prohibited in the deer critical winter range from December 1 to May 1. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Approximately 12.5 miles of Blue and Calamity Creeks would be maintained as sport fisheries.

Threatened and Endangered Species. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

Recreation. The area would be managed as an intensive recreation management area. The areas near 27-1/4 Road at Cycle Park and north of 29 Road would be managed as group use and intensive off-road vehicle (ORV) areas. A no-shooting zone would be identified two miles north of the Highline Canal.

Off-Road Vehicles. Competitive off-road vehicle events and intensive use would be allowed to continue at Cycle Park and the adjacent ORV area. The Palisade watershed would be closed to vehicle

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use. The remainder of the area would be limited to existing roads.

Visual Resources. The visual resource management classes identified through the VRM inventory would be adopted as the VRM objective.

Land Tenure. When an application is submitted, the Bureau would work with the FAA and the Walker Field Airport Authority on the potential airport expansion concerning approximately 2,240 acres of public land.

Public Utilities. Within the Palisade municipal watershed, about 4,600 acres would be designated sensitive for public utilities.

Transportation. Public access would be acquired across 29 and 32 Roads. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 300 acres would be managed for critical fire suppression (oil and gas facilities, significant cultural sites, improvements), and approximately 8,600 acres would be managed for full suppression. Approximately 3,040 acres would be managed for limited suppression, and approximately 200 acres would be managed for wilderness fire activities (riparian areas, critically/severely-eroding soils).

Area Gd: Emphasis on Land Disposal

Land Disposal. A total of 91 tracts containing approximately 7,640 acres would be identified for disposal. Prior to disposal, the resources within these tracts would be managed as described under this emphasis area. Little if any funds would be spent for on-the-ground improvements for resource management on these tracts. Mineral estates would be conveyed with the surface where mineral values are known not to exist or where retaining the mineral rights would interfere with or preclude nonmineral development of the land which is a more beneficial use of the land than mineral development.

Locatable Minerals. All potential disposal tracts would remain open to mineral location unless previously withdrawn from the general mining laws.

Coal. Any potential disposal tracts that are within the potential coal development area would be acceptable for further coal leasing consideration.

Oil and Gas. Potential disposal tracts (7,640 acres) would be available for leasing for oil and gas exploration and development with standard lease terms.

Mineral Materials. Potential disposal tracts would be identified as open to mineral materials sales or free use permits except for those areas closed because of existing withdrawals.

Forestry. Sawtimber and fuelwood harvesting would be allowed to continue pending disposal.

Livestock Grazing. Limited management of the range would occur on all land identified for disposal. There would be no new range projects or studies initiated on these areas. When the sale would necessitate adjustment of the grazing permit, the permittees would be notified two years prior to selling the grazing land.

Recreation. Recreation would not be managed in areas identified for disposal.

Off-Road Vehicles. The area would be designated as open to off-road vehicle use.

Visual Resources. No visual resource management objectives would be adopted.

Public Utilities. All tracts (7,640 acres) would be designated sensitive to public utilities. Only right-of-way applications that would not unduly depreciate the tracts' appraised values would be approved.

Transportation. No additional access would be acquired specifically for management of these tracts. Public access would be reserved across these tracts where it would benefit the public.

Fire. All potential disposal tracts would be managed as critical protection zones.

Areas Hc/Hp: Emphasis on Forestry

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting except for approximately 3,968 acres in the following locations which would be identified as unsuitable for management: The Falls (15 acres, recreation); Gateway (2,865 acres), adverse location; Pinyon Mesa (673 acres), adverse location; Gibbler Mountain (79 acres), adverse location; Mount Lincoln (264 acres), adverse location; and Corcoran Point (336 acres), fragile soils. Activity plans would be designed to meet wildlife objectives. The rotation age for aspen would also be increased to 80 years to provide more quality wildlife habitat. Timber harvesting would be limited near Pine Mountain to maintain the natural setting.

Locatable Minerals. Miracle Rock (40 acres) and the Falls (200 acres) recreation sites would continue to be closed to mineral location. The remainder of the area would be identified as open.

Oil and Gas. Lands within this area would be available for leasing with standard lease terms or

Protection Alternative

with appropriate stipulations to protect sensitive resources. Sensitive resources that would be protected area shown in Table 2-6.

Mineral Materials. Approximately 240 acres would be closed to protect recreation sites. The remainder of the area would be open for mineral materials sales and free use permits.

Wildlife. Wildlife would be managed primarily for the habitat of the wild turkey. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches.

Threatened and Endangered Species. The Uinta Basin hookless cactus would be protected from surface-disturbing activities. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities. Six sensitive plants, Jones' amsonia, Osterhout's catseye, Grand Junction and Wetherill's milkvetches, and Eastwood's and side-lobed lomatiums, would be protected from surface-disturbing activities.

Recreation. The Miracle Rock recreation site would continue to be managed. The remainder of the emphasis area would be managed as an extensive recreation management area.

Off-Road Vehicles. Vehicle use would be limited to existing roads and trails.

Visual Resources. The area would be managed under existing VRM inventory class objectives.

Public Utilities. Approximately 1,900 acres within six areas containing threatened and endangered species would be designated sensitive for public utilities. Approximately 80 acres within developed recreation sites would be designated unsuitable for public utilities. Other resource concerns which would be designated sensitive for public utilities are shown in Table 2-19, Public Utility Restriction Recommendations.

Transportation. Public access would be acquired to Timber Ridge, Roan Creek, Coates Creek, and along the East Douglas Pass divide road for general public use.

Fire. The emphasis area would be managed as a full suppression area on approximately 27,690 acres (in Roan Creek, Glade Park, and John Brown Canyon). The remaining 76,390 acres located in the Baxter/Douglas Pass, Deer Park, and Calamity Mesa areas would be managed as a limited suppression area.

Areas Jd/Jg/Je: Emphasis on Off-Road Vehicles

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails in the Rabbit Valley paleontological site, Snook's Bottom, Lower Flume,

Devil's and Pollack Canyons. The Fruita paleontological site, Skipper's Island and McDonald Creek would be closed to vehicle use. Two areas near Mount Garfield would be identified for intensive off-road vehicle use. The remainder of the area would be limited to existing roads.

Water. Approximately 27 miles of actively-eroding stream channels would be treated in Big Salt Wash, East Salt Creek, and Hunter Wash.

Locatable Minerals. The entire emphasis area would be identified as open to mineral location except for 280 acres in Rabbit Valley and for existing withdrawals.

Oil and Gas. Lands within this area would be available for leasing with standard lease terms or with appropriate stipulations to protect sensitive resources. Sensitive resources that would be protected are shown in Table 2-6.

Mineral Materials. The entire area would be identified as open to mineral materials sales and free use permits except for 560 acres for paleontological values, 37 acres for threatened and endangered values.

Paleontological Resources. The Rabbit Valley and Fruita paleontological sites would be identified for protective management. These sites would designated research natural areas.

Wildlife. Wildlife would be managed primarily for the habitat of the unique species of desert life. Woody riparian habitat would be maintained to favor the tallest native plant species. Skipper's Island would be maintained as a special management area for the benefit of wildlife habitat.

Threatened and Endangered Species. The black-footed ferret would be protected from surface disturbance within its identified potential habitat. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities.

Suitable habitat would be provided in the Colorado River for the reintroduction of humpback chub, bonytailed chub, and razorback sucker. Raptor and blue heron nesting areas would be closed to special recreation events from February 15 to July 15 and golden eagle nesting areas from January 15 to July 15.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. The MacDonald Creek archaeological site would be identified for active management as a high value site. The Dead Indian site would also be actively managed.

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Recreation. The Grand Valley would be designated as an intensive recreation management area and managed to reduce user conflicts. The following areas would be designated as no-shooting zones: 2 miles north of the Highline Canal, 1 mile south of the Orchard Mesa Canal, the Snook's Bottom area, and 1 mile either side of Little Park Road from the Gunnison River to a point 2 miles past the turnoff to Rough Canyon.

Special Management Areas. Skipper's Island (160 acres) would be designated as an Area of Critical and Environmental Concern to protect and enhance riparian values. Understory vegetation would be manipulated to reduce fire hazard to cottonwood and willows.

Visual Resources. The visual resource management classes identified through the visual resource management inventory would be adopted as the visual resource management objective for this area.

Land Tenure. Approximately 100 acres of private land would be identified for acquisition on or near Skipper's Island. About 440 acres in Devil's Canyon and 320 acres in Flume Canyon would be identified for acquisition.

Public Utilities. Rabbit Valley (10,900 acres), Snook's Bottom (2,000 acres), and the areas of critical environmental concern would be designated sensitive for development of public utilities. The Fruita paleontological site (280 acres), and Skipper's Island (160 acres) would be designated unsuitable for public utilities.

Transportation. Public access would be acquired to McDonald Creek for recreation and cultural resource management.

Fire. The entire emphasis area would be managed as a full suppression area.

Area M: Emphasis on Areas of Critical Environmental Concern (ACECs)

Areas of Critical Environmental Concern (ACECs). Management of these areas are discussed in the Special Management Areas sections of Emphasis Areas A-1, A-4, Jd, Ou, K, N, and Pv.

Areas N: Emphasis on Threatened and Endangered Species

Threatened and Endangered Species. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities. Important habitat features of these species would be identified. A minimum of 10 acres would be identified as a research natural area to observe and protect the seven sensitive plant species. Habi-

tat would be provided for the establishment of a breeding pair of peregrine falcons in the Roan Creek area. Acquisition of a minimum stream flow to protect the Colorado River cutthroat trout habitat would be recommended in the upper Roan Creek drainage and, thereby, also protect the sensitive cascade-dependent plants. The Uinta Basin hookless cactus would be protected. Disturbance within one-quarter mile (approximate buffer radius) of active nests of golden eagles from January 15 to July 15 and of prairie and peregrine falcons from February 15 to July 15 would not be permitted.

Water. Surface-disturbing activities would be prohibited within the Palisade municipal watershed.

Locatable Minerals. The Rough Canyon area would be identified as closed to mineral location. Thirty-seven acres at Unaweep Seep would be identified as closed to location.

Oil and Gas. Lands within this area would be available for leasing with standard lease terms or with appropriate stipulations to protect sensitive resources. Sensitive resources that would be protected are shown in Table 2-6.

Mineral Materials. Approximately 37 acres would be closed to mineral materials sales and free use permits at Unaweep Seep.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Activity plans would be designed to meet wildlife objectives in the Book Cliffs. The woodlands below the Book Cliffs escarpment would be closed to wood harvests. All dead wood, both standing and down, in the Baxter-Douglas and Mount Garfield areas would be retained (green wood sales only).

Wildlife. Wildlife would be managed primarily for the habitat of raptors and sensitive plant species. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Sagebrush stands with 40 percent canopy cover or less would not be converted to other cover types. Riparian habitat would be maintained to favor the tallest native plant habitats. Riparian areas would receive special attention in the implementation of livestock grazing management plans. Surface-disturbing activities would be prohibited in deer and elk critical winter ranges from December 1 to May 1.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

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Cultural Resources. The Rough Canyon area would be identified for active management as a high value site.

Recreation. The Grand Valley (176,000 acres), Bang's Canyon (40,000 acres), and Hunter/Garvey Canyons (19,000 acres) would be designated as intensive recreation management areas. The remainder of the area would be identified as an extensive recreation management area.

Off-Road Vehicles. Vehicle use would be limited to existing roads and trails except that the Cryptantha Elata site (160 acres) would be closed and Pyramid Rock (470 acres) would be limited to designated roads and trails.

Visual Resources. The visual resource management classes identified through the visual resource management inventory would be adopted as the visual resource management objective for this area.

Special Management Areas. Pyramid Rock (470 acres) would be designated a research natural area and allowed to be included as a state natural area. Unaweep Seep Research Natural Area (37 acres) would be continued as a state natural area. An additional 403 acres of watershed above the seep would be protected from surface disturbance.

Public Utilities. The Badger Wash Area of Critical Environmental Concern (685 acres) would be designated unsuitable for public utilities.

Transportation. Public access would be maintained through the Rough Canyon Area of Critical Environmental Concern. New road construction would be prohibited in Hunter Canyon. Public access would be acquired to Cow Ridge, Horse Mountain, Carr Creek, from Roan Creek to the East Douglas Pass road, 4A Mountain, and Brush Mountain. Within deer and elk critical winter range, the average density of roads would be kept below 2 miles per square mile. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 10,000 acres (oil and gas facilities, improvements, areas adjacent to critical habitat sites) would be managed for critical fire suppression, and the remaining 96,855 acres would be managed for limited fire suppression.

Areas Oa: Emphasis on Riparian Areas

Wildlife. Wildlife management emphasis would be placed on protecting and improving approximately 3,000 acres of riparian habitat. This current acreage of riparian habitat would be maintained.

The habitat condition goal would be to manage for at least an upper seral state. Suitable habitat would also be provided in streams and ponds for the stocking of sport fishes.

Riparian areas would receive special attention in the implementation of livestock grazing management plans. Approximately 20 acres of salt cedar would be converted to cottonwood and willow in East Salt Creek, and about 20 acres of flammable woodland understory would be converted to less flammable warm season grasses and shrubs on Skipper's Island. Sport fisheries would be maintained or improved along 48 miles of 18 streams.

Water. Culverts to withstand 25-year floods would be required for stream crossings on all perennial streams.

Locatable Minerals. The area would be open to mineral location except for existing withdrawals and 35,000 acres along the Gunnison and Dolores Rivers.

Coal. Approximately 4,100 acres (the Colorado River corridor) would be identified as unsuitable for further coal leasing consideration based on multiple use tradeoffs (see Appendix D).

Oil and Gas. Approximately 6,145 acres would be available for leasing with additional stipulations to protect perennial streams and riparian habitat. In addition, appropriate stipulations would be attached in order to protect major river corridors, threatened and endangered species, important wildlife habitat, and developed recreation sites.

Mineral Materials. The area would be closed to mineral materials sales and free use permits.

Forestry. Riparian areas would continue to be managed to meet wildlife objectives. Timber harvesting would be restricted within Big and Little Dominguez Canyons and within 200 feet of perennial streams. The collection of down and dead firewood for campfires would continue to be allowed.

Threatened and Endangered Species. Areas of bald eagle concentrations would be protected from disturbing activities between December 1 and April 1. Suitable habitat would be provided in the Gunnison and Colorado Rivers for the reintroduction of the bonytailed chub, Colorado River squawfish, razorback sucker, and humpback chub.

Livestock Grazing. Livestock would continue to be grazed at existing levels. No new livestock trails would be permitted in riparian areas, and riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. The Dominguez-Escalante route would be mapped along the Colorado River and Roan Creek.

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Recreation. The Dolores River and Gunnison River Canyons (approximately 35,000 acres) would be identified as intensive recreation management areas. Commercial river permits would be required on the Dolores, Gunnison and Colorado Rivers. Minimum impact camping regulations would be instituted.

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails. The county road southwest of Dominguez Recreation Site would be closed from approximately December 1 to April 15.

Visual Resources. The visual resource management classes identified through the visual resource management inventory would be adopted as the visual resource management objectives.

Land Tenure. Approximately 100 acres of private land would be identified for acquisition on Skipper's Island as discussed in Land Tenure Adjustments section.

Public Utilities. Riparian areas (6,145 acres) would be designated sensitive for public utilities. Skipper's Island (160 acres) would be designated unsuitable.

Transportation. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. The entire emphasis area would be managed for wilderness fire activities on all riparian areas. Isolated sites (significant cultural sites, improvements) would be given critical fire suppression protection. These sites amount to approximately 3,000 acres.

Areas Ou: Emphasis on Wildlife

Wildlife. Wildlife would be managed primarily for the habitat of deer, elk, bear, and pronghorn antelope. The distribution of deer and elk use on summer range would be improved north of the Book Cliffs. Winter range forage production would also be improved, especially on ranges of unevenly distributed big game use. Water for pronghorn and waterfowl would be developed. A location would be identified for a 30- to 60-acre reservoir and marsh to provide habitat for resident and migrant wildlife. This site would be made available for construction and management by appropriate agencies for public use. Disturbing activities would be prohibited in deer and elk critical winter ranges and migration corridors and bighorn sheep primary ranges from December 1 to May 1 and in elk calving areas from May 15 to June 15. The aspen cover types and any known specific calving ground (400 acres) within

the critical area would be protected. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Sagebrush stands with 40 percent canopy cover or less would not be converted to other cover types. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches.

Soils. The high soil slump hazard on 18,000 acres in the Baxter/Douglas Pass area would be managed to exclude surface facilities.

Water. Salt and sediment yield would be reduced from 5,200 acres of critically-eroding soils in the Big Wash and Roan Creek areas and on 900 acres in Snyder Canyon. Three miles of actively-eroding stream channels would be treated along two tributaries to Dry Fork.

Locatable Minerals. The entire area would be identified as open to mineral location except for 11,050 acres (1,230 acres for Badger Wash Uplands, 470 acres for Pyramid Rock, 350 acres for Indian Creek, and 9,000 acres for Transect 7).

Coal. The Palisade municipal watershed would be identified as unsuitable based on coal unsuitability criterion 17, and the Goblins would be identified as unsuitable based on multiple use tradeoffs (see Appendix D).

Oil and Gas. Lands within this area would be available for leasing with standard lease terms or with appropriate stipulations to protect sensitive resources. Sensitive resources that would be protected are shown in Table 2-6.

Mineral Materials. The Palisade municipal watershed, Pyramid Rock, Transect 7, Badger Wash Uplands, elk calving areas, and Baxter/Douglas Pass and Indian Creek Areas of Critical Environmental Concern would be identified as closed to mineral sales and free use permits. The remainder of the emphasis area would remain open for consideration.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Approximately 15 acres of commercial forest land at Mud Springs would be identified as unsuitable for management and harvesting to protect recreational values. Activity plans would be designed to meet wildlife objectives, including increasing the rotation age of aspen to 80 years. Fuelwood sales would be prohibited below the escarpment of the Book Cliffs and between the Gunnison River and U.S. Highway 50 to protect wildlife values. Dead fuelwood sales would also be prohibited west of Big Salt Creek for ecological reasons. All dead wood, both standing and down, in the Baxter/Doug-

Protection Alternative

las Pass and Mount Garfield areas would be retained (green wood sales only).

Threatened and Endangered Species. Two species of endangered and threatened cacti would be protected. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities. Disturbance to bald eagle winter concentration areas would not be permitted from December 1 to April 1. Disturbance within one-quarter mile (approximate buffer radius) of active nests of golden eagles from January 15 to July 15 and of prairie falcons from February 15 to July 15 would not be permitted.

Livestock Grazing. Riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. Transect 7 and the Middle Mesa site would be actively-managed as high value archaeological sites.

Recreation. Approximately 18,000 acres along the Gunnison River would be designated as an intensive recreation management area. Management would focus on maintaining the existing semi-primitive motorized recreational opportunities and on backcountry use. Management of the Mud Springs Campground would continue. The remainder of the emphasis area would be managed as an extensive recreation management area.

Off-Road Vehicles. Vehicle use in the Indian Creek Area of Critical Environmental Concern (350 acres), Badger Wash, Uplands (1,230 acres) and the Baxter/Douglas Pass soil slump area (18,000 acres) would be limited to designated roads and trails. The Beehive area would be closed to vehicle use from December 1 to May 1 to protect deer winter range. Elsewhere, vehicle use would be limited to existing roads.

Visual Resources. The visual resource management classes identified through the visual resource management inventory would be adopted as the visual resource management objective for this area.

Special Management Areas. Indian Creek (350 acres), Badger Wash, Uplands (1,230 acres) and the Baxter/Douglas Pass soil slump area (18,000 acres) would be designated as areas of critical environmental concern to protect cultural values, the threatened and endangered plant species and hazardous soils, respectively.

Public Utilities. The Pyramid Rock (470 acres) and Indian Creek (350 acres) Areas of Critical Environmental Concern would be designated unsuitable for public utilities. The Baxter/Douglas Pass Area of Critical Environmental Concern (18,000 acres), the Gunnison River Intensive Recreation Management Area (18,000 acres), and Mud Springs Recreation

Site (40 acres) would be designated sensitive for public utilities.

Transportation. Administrative access would be acquired to Haystack Peaks, Crawford Peak, and Snyder Flats. Public access would be acquired to the Barrel Springs area, Middle North Dry Fork, Indian Creek area, Prairie Canyon, Upper Big Salt Wash, South Canyon, Buniger Road, Logan Wash, and Beehive for general public use. Administrative access would be acquired to Chalk Mountain for forest and range management.

Fire. The entire emphasis area would be managed for full suppression on approximately 94,690 acres, for limited suppression on 77,024 acres, and for prescribed burns on approximately 27,000 acres. Approximately 3,000 acres would be managed as critical fire suppression areas (oil and gas facilities, coal outcrops, cultural sites, improved recreational sites).

Areas Pv: Emphasis on Visual Resources

Visual Resources. The Mount Garfield area (9,520 acres) would be identified as a visual resource management Class I area.

Locatable Minerals. The entire emphasis area would be identified as closed to mineral location.

Coal. Approximately 9,520 acres would be identified as unacceptable for coal leasing consideration.

Oil and Gas. Lands in this area would be available for leasing with stipulations to protect important visual resource values. In addition, appropriate stipulations would be attached in order to protect other sensitive resources. Sensitive resources that would be protected are shown in Table 2-6.

Mineral Materials. The entire area would be identified as closed to mineral materials sales and free use permits.

Wildlife. Wildlife would be managed primarily for the habitat of raptors.

Threatened and Endangered Species. Surface-disturbing activities would be prohibited within one-quarter mile of active nests from February 15 to July 15 to protect prairie falcons and other raptors. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities.

Wild Horses. The area outside the Little Book Cliffs Wilderness Study Area would be managed according to the Little Book Cliffs Wild Horse Management Plan.

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Recreation. The area would be designated as part of the Grand Valley intensive recreation management area.

Off-Road Vehicles. The area would be closed to off-road vehicle use.

Special Management Areas. The area would be designated as an area of critical environmental concern.

Public Utilities. The entire area would be designated unsuitable for public utilities.

Fire. The entire emphasis area would be managed as a limited suppression area.

Areas K: Emphasis on General Natural Resource Management

Water. Sediment yield would be reduced on approximately 19,600 acres of critically-eroding soils and some saline soils in the De Beque Cutoff, Dolores River, and Corcoran Wash areas. Twelve miles of actively-eroding stream channels would be treated along Sand Wash, Horseshoe Canyon, and two tributaries to the Dolores River.

Locatable Minerals. The entire area would be open to mineral location except for existing withdrawals and the 5 acres in the Gunnison Gravels Research Natural Area.

Coal. Approximately 1,370 acres would be identified as acceptable for further leasing consideration. The soils hazard area of critical environmental concern would be identified as unacceptable for leasing based on multiple use tradeoff decisions (see Appendix D).

Oil and Gas. Lands within this area would be available for leasing with standard lease terms or with appropriate stipulations to protect sensitive resources. Sensitive resources that would be protected are shown in Table 2-6.

Mineral Materials. The soils area of critical environmental concern would be identified as closed to mineral materials sales and free use permits. Five acres for the Gunnison Gravels Research Natural Area, 15,000 acres for Sinbad Valley, 40,000 acres for Unaweep Canyon, and 510 acres for cultural sites would be closed to mineral materials disposal.

Forestry. Productive pinyon-juniper woodlands would be identified as suitable for management and harvesting.

Wildlife. Wildlife would be managed primarily for the habitat of deer, elk, and bear. The distribution of big game on summer ranges would be improved by water developments and forage improvements. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most

fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Sagebrush stands with 40 percent canopy cover or less would not be converted to other cover types. Riparian habitat would be maintained to favor the tallest native plant habitats.

Threatened and Endangered Species. Known important habitat sites of sensitive plant and animal species would be protected from disturbing activities. The Uinta Basin hookless cactus in the Collbran area would be protected from surface disturbance. Disturbing activities between February 15 and July 15 and permanently manned facilities would not be permitted within one-quarter mile of an active peregrine falcon nest.

Cultural Resources. Ladder Canyon would be identified as a high value site for active management.

Recreation. The Dolores River Canyon would be designated as an intensive recreation management area (27,000 acres) and managed to protect natural scenic values and riverine recreation opportunities to the extent possible without designation. The one-half mile wide river corridor upstream from Gateway would be managed according to recreation river guidelines and downstream from Gateway according to scenic river standards. Whitewater Hill would be managed as a group use area, Reeder Ridge would be managed as a hanggliding area, and the remainder of the emphasis area would be managed as an extensive recreation management area. Surface-disturbing activities would be prohibited adjacent to Juanita Arch to protect scenic values—

Off-Road Vehicles. Vehicle use would be limited to designated roads and trails on 14,700 acres on the south slope of Battlement Mesa.

Visual Resources. Visual resources would be managed according to existing class standards.

Special Management Areas. Approximately 18,000 acres of soil slump areas would be designated as an area of critical environmental concern. Surface facilities and surface-disturbing activities such as vegetation manipulations and timber harvesting would be prohibited in these areas.

Public Utilities. Approximately 18,000 acres within the soils area of critical environmental concern would be designated unsuitable for public utilities. The Dolores River Canyon Intensive Recreation Management Area (27,000 acres) would be designated sensitive for public utilities.

Transportation. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to

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protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 170,294 acres would be managed for full fire suppression, 76,000 acres would be managed for limited fire suppression.

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Area A-1: Emphasis on Recreation

Recreation. Ruby Canyon would be managed as an intensive recreation management area. The area would be managed according to scenic river designation criteria to the extent possible without formal designation except no scenic easements would be acquired. Permits would be required for both commercial and private floatboating use. Motorized boat use would be allowed. Minimum impact camping regulations would be followed. The area would be managed to maintain semi-primitive recreation opportunities with emphasis on maintenance of the natural setting. Once acquired, the Loma launch site would be managed as a public launching site.

Locatable Minerals. Approximately 4,000 acres (one-quarter mile on the north side of the river) would be closed to mineral location to protect the recreational setting. The remainder of the area would be open to location.

Oil and Gas. Approximately 8,000 acres (one-half mile on the north side of the river) would be available for leasing with a no surface occupancy stipulation to protect the high value recreational and scenic resources associated with the Colorado River corridor. In addition, habitat of the threatened and endangered species, riparian habitat, and perennial streams would be protected by other stipulations.

Mineral Materials. Approximately 8,000 acres (one-half mile on the north side of the Colorado River) would be closed to mineral materials sales and free use permits.

Wildlife. Wildlife would be managed primarily for the habitat of endangered and riparian species. Wildlife management would focus on improving the chances of cottonwood survival and increasing the area of the cottonwood stands along the Colorado River. Riparian habitat would be maintained to favor the tallest native plant species in woody plant habitat. Surface disturbance would be prohibited in riparian areas. Habitat to support the resident deer population would be maintained.

Threatened and Endangered Species. Approximately 5,750 acres of bald eagle and peregrine

falcon habitat would be identified for active management and protection. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Active peregrine falcon nests would be protected from surface-disturbing activities from February 15 to July 15. Known important habitat sites of sensitive animal and plant species and communities would be protected from surface-disturbing activities. Suitable habitat would be provided for the reintroduction of peregrine falcon and the four endemic Colorado River fish in cooperation with the Colorado Division of Wildlife and U.S. Fish and Wildlife Service.

Livestock Grazing. Livestock grazing would continue. No additional livestock trails would be allowed to be constructed to the river bottomland. Riparian areas would receive special attention in the implementation of livestock grazing management plans. They would be maintained to appear natural with grassy river bottomlands, native shrubs and tree species, particularly cottonwoods.

Visual Resources. Approximately 8,000 acres (one-half mile on the north side of the Colorado River) would be identified and managed as a visual resource management class II area.

Off-Road Vehicles. Vehicles would be limited to existing roads on the north side of the Colorado River to protect scenic values and closed on the south side of the river because of the wilderness recommendation.

Wilderness. The south side of the Colorado River would be recommended as wilderness as part of the Black Ridge Canyons WSA. Motorized boats would be allowed to land on the south side of the river.

Land Tenure. The Loma launch site would be recommended for acquisition.

Public Utilities. The area containing the railroad and a proposed water pipeline at Crow Bottom (200 acres) would be identified as sensitive. The rest of the area (7,800 acres) would be identified as unsuitable.

Transportation. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. The entire emphasis area would be managed for full suppression; the Loma launch site (3 acres) would be managed for critical fire suppression.

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Area A-2: Emphasis on Recreation

Recreation. Approximately 40,000 acres in the Bang's Canyon area would be designated as an intensive recreation management area (as part of the Grand Valley Intensive Recreation Management Area) and managed to maintain semi-primitive motorized and non-motorized recreation opportunities, scenic and natural values, and activities such as horseback riding, hiking, and trail-oriented off-road vehicle use. Rough, Ladder, Northeast Creek, and Bang's Canyons would be protected from surface-disturbing activities. The Little Park Road area would be identified as a no-shooting zone. Permits would be required on the Gunnison River for commercial boating use. Small improvement projects such as spring developments, fencing, water catchments, and vegetative manipulations (20 acres or less) would be permitted. The collection of down and dead fuelwood would be permitted along the Gunnison River only for immediate campfire use. Management of the Dominguez Recreation Site and the Bridgeport river launch site and trailhead would continue.

Soils. Approximately 1,000 acres of critically-eroding soils in Cactus Park would be protected by limiting surface-disturbing activities.

Water. Sediment yield would be reduced from the Rough Canyon and Cactus Park areas (10,000 acres). Salinity yield would be reduced from the Rough Canyon area (3,700 acres). Two severely-eroding channels in the Rough Canyon area (8.3 miles) and the severely-eroding channel in Cactus Park (2.9 miles) would be treated.

Locatable Minerals. The Dominguez Recreation Site (40 acres) would be closed to mineral location. The remainder of the area would be open except for existing withdrawals.

Oil and Gas. Approximately 30,033 acres would be available for leasing with standard lease terms. Approximately 52,300 acres would be available for leasing with other stipulations to protect a research natural area (Gunnison Gravels), scenic and natural values (Bang's Canyon Intensive Recreation Management Area), deer and elk winter range, perennial streams, threatened and endangered species, and steep slopes. Approximately 24,550 acres would be available for leasing with a no surface occupancy stipulation to protect the Gunnison River corridor, three known cultural sites, a developed recreation site, and Rough, Bang's, Ladder, and Northeast Creek Canyons.

Mineral Materials. Approximately 15,080 acres in Dominguez Recreation Site, Rough, Ladder, Bang's, and Northeast Creek Canyons and the Gunnison Gravels would be closed to mineral materials sales or free use permits.

Forestry. Approximately 30,373 acres of productive pinyon-juniper woodlands and 654 acres of commercial forest land would be identified as suitable for management and harvesting. Approximately 79 acres of productive pinyon-juniper woodlands on Gibbler Mountain would be identified as unsuitable for management and harvesting because of adverse location. Cutting units in the Bang's Canyon IRMA would be limited to 20 acres or less in the pinyon-juniper woodlands to protect recreation and scenic values. All new roads in the Bang's Canyon Intensive Recreation Management Area would be reclaimed following logical development. Fuelwood sales would be designed to benefit wildlife objectives according to specified procedures (Appendix A). Only commercial fuelwood harvest would be authorized in Northeast Creek Canyon. All roads constructed for timber harvesting would be temporary, would be rehabilitated to blend in with the characteristic landscape, and would not be evident to the casual observer.

Wildlife. Wildlife would be managed primarily for the habitat for deer and elk and wild turkey. Management would focus on drawing big game winter use out of Glade Park and into this emphasis area. Deer and elk critical winter range would be protected from disturbing activities from December 1 to May 1. Habitat would be provided in the upper Dominguez Canyon area for the rehabilitation of wild turkey. Sport fisheries would be maintained in Northeast, Big and Little Dominguez Creeks. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas to be reserved from treatment would be selected with flexibility to accommodate feasibility.

Threatened and Endangered Species. Approximately 48,525 acres (much of it overlapping) of spineless hedgehog cactus, Uinta Basin hookless cactus, and bald eagle habitat would be identified for active management and protection. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Two species of endangered and threatened cacti would be protected. Known important habitat sites of sensitive plant and animal species would be protected from surface-disturbing activities.

Livestock Grazing. The visual and ecological integrity of riparian areas would receive special atten-

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tion in the implementation of livestock grazing management plans.

Cultural Resources. Rough Canyon, Ladder Springs, and Cactus Park archaeological sites (approximately 1,740 acres) would be actively managed as high value site areas.

Off-Road Vehicles. Vehicle use in the Bang's Canyon Intensive Recreation Management Area would be limited to designated roads and trails to protect the natural scenic setting. The remainder of the area would be limited to existing roads.

Visual Resources. Bang's, Rough, Ladder and Northeast Creek Canyons (14,080 acres), the cliffs of Unaweep Canyon (14,080 acres), and the Gunnison River corridor (8,960 acres) would be managed under VRM Class II objectives. The benches in the Bang's Canyon IRMA (25,920 acres) and the valley of Unaweep Canyon (6,400 acres) would be managed under VRM Class III objectives.

Special Management Areas. Rough Canyon and Gunnison Gravels would be designated as a research natural areas to protect scientific geologic values.

Public Utilities. One developed recreation site, the Gunnison River corridor, the canyons in the Bang's Canyon area, three high value archeological sites, and disposal tracts (totaling 24,550 acres) would be identified as unsuitable for public utilities. Threatened and endangered species habitat, Gunnison Gravels, perennial streams, deer and elk winter range, bighorn sheep range, slopes greater than 40 percent, and the remainder of Bang's Canyon (52,300 acres) would be identified as sensitive to public utilities. A half-mile wide corridor would be identified along the Unaweep Canyon road for telephone and small electrical distribution lines.

Transportation. Public access would be acquired for general resource management from Unaweep Canyon to Little Park and Cactus Park. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 62,360 acres would be managed for full fire suppression. The Dominguez Recreation Site of approximately 40 acres would be managed for critical fire suppression, and the Bang's Canyon area of approximately 40,000 acres would be managed for limited fire suppression.

Area Cc: Emphasis on Coal

Coal. (Note: The Little Book Cliffs Wilderness Study Area lies partially within this emphasis area but mostly within the wild horse emphasis area E. Therefore, all discussion on management of the Little Book Cliffs WSA is presented under emphasis area E.)

Approximately 350,389 acres would be identified as acceptable for further coal leasing consideration. This includes the Little Book Cliffs and Demaree Canyon Wilderness Study Areas, presently identified as unsuitable for leasing based on Coal Unsuitability Criterion 4 (see Appendix D). The unleased portion of the Palisade municipal watershed (10,000 acres) and the Colorado River corridor (4,100 acres) would be identified as unsuitable based on Coal Unsuitability Criteria 3 and 17, respectively (see Appendix D). The coal unsuitability criteria were not applied to existing coal leases. The existing coal leases (covering 4,000 acres) in the Palisade municipal watershed would be allowed to develop. Stipulations to protect the watershed would be added to the mine plan during the mine plan approval process. Approximately 162,660 acres would be identified as sensitive to coal development based on Coal Unsuitability Criteria 2, 3, 7, 9, 10, 11, 13, 14, 15 and 19 (see Appendix D). Stipulations would be placed on coal development within these areas to protect the sensitive resources (see Appendix D). Surface facilities would be prohibited in the following areas: Baxter/Douglas Pass soil slump area, elk calving area, and the Goblins.

Soils. Approximately 18,000 acres with extremely high slump hazard in the Baxter/Douglas Pass area would be protected by limiting surface-disturbing activities and prohibiting surface occupancy.

Water. Sediment yield would be reduced from the upper Big Wash watershed (1,500 acres). Salinity yield would be reduced from upper Big Wash watershed (1,200 acres). Approximately 5.2 miles of severely-eroding stream channel would be treated in Horseshoe Canyon. The Palisade municipal watershed (14,000 acres) would be protected from surface-disturbing activities that adversely affect water supplies.

Locatable Minerals. The entire area would be identified as open to mineral location except for existing withdrawals.

Oil and Gas. Approximately 243,776 acres would be available for leasing with standard lease terms. Approximately 26,520 acres would be available for leasing with a no surface occupancy stipulation to protect Douglas/Baxter Pass soil slump area, a recreation area (Island Acres), scenic and natural values (the Goblins), Hunter/Garvey Canyons cliffs;

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and approximately 170,500 acres would be available for leasing with other stipulations to protect steep slopes, threatened and endangered species, scenic and natural values (Colorado 139 and Hunter/Garvey Canyons benches), elk calving area, deer and elk winter range, perennial streams, the Palisade municipal watershed, and the Colorado River corridor.

(Note: The Demaree Canyon Wilderness Study Area (WSA)—recommended under this alternative as unsuitable for wilderness designation—would be closed to additional leasing pending Congressional action on wilderness recommendations. However, in the interim, existing leases issued prior to the passage of the Federal Land Policy and Management Act (FLPMA) of 1976 would be allowed to develop in this WSA, subject to the unnecessary or undue degradation standard if nonimpairment could not be met. Following Congressional action on wilderness recommendations, Demaree Canyon WSA would be open to leasing.

Mineral Materials. The following areas would be closed to mineral materials sales and free use permits: the Goblins (80 acres), Island Acres Recreation Area (80 acres), elk calving area (400 acres), the critical soils area (18,000 acres), Plateau Creek slump (860 acres), Baxter/Douglas Pass VRM Class II area (1,920 acres), Hunter/Garvey Canyons (7,600 acres). The remainder of the area would be open.

Forestry. Approximately 15,924 acres of productive pinyon-juniper and 96 acres of commercial forest land would be identified as suitable for management and harvesting. Approximately 1,405 acres of productive pinyon-juniper woodlands and 802 acres of commercial forest land in the following locations would be identified as unsuitable for management and harvesting: Palisade municipal watershed (1,207 acres); Mount Lincoln (264 acres), adverse location; Corcoran Point (336 acres), fragile soils; Baxter/Douglas Pass area (400 acres), elk calving sites. Dead pinyon and juniper would not be harvested west of Big Salt Creek. The first priority for manipulating pinyon-juniper woodlands would be harvesting. Fuelwood sales would be designed to meet wildlife objectives on big game winter range.

Wildlife. Wildlife would be managed primarily for the habitat of deer, elk, and bear. Wildlife management would focus on expanding the area useable as summer range for deer. Deer and elk critical winter range would be identified as sensitive to coal leasing (see Appendix D). Disturbing activities would be prohibited in deer and elk critical winter ranges from December 1 to May 1 and in elk calving areas from May 15 to June 15. Aspen stands and identified calving sites within the elk calving area would be protected from surface disturbance.

Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas to be reserved from treatment would be selected with flexibility to accommodate feasibility. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. The fisheries potential would be maintained or improved in East and Big Salt Creeks.

Threatened and Endangered Species. Approximately 37,100 acres (much of it overlapping) of spineless hedgehog and Uinta Basin hookless cacti, bald eagle, and peregrine falcon habitat would be identified for active management and protection. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Active peregrine falcon nests would be protected from surface-disturbing activities from February 15 to July 15. Two species of endangered and threatened cacti would be protected. Known important habitat sites of sensitive plant and animal species would be protected from surface-disturbing activities.

Livestock Grazing. The ecological integrity of riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. Fifty-four significant cultural sites and one region (Transect 7, on which procedures for nomination to the National Register of Historic Places have been initiated) would be identified as sensitive to surface-disturbing activities. The total acreage is 9,100 acres.

Recreation. The emphasis area would be managed as an extensive recreation management area. Hunter and Garvey Canyons would be managed to provide opportunities for semi-primitive motorized and non-motorized recreation.

Off-Road Vehicles. The Palisade municipal watershed (4,640 acres) would be closed to vehicle use. Vehicle use in the Baxter/Douglas Pass soil slump area (18,000 acres) would be limited to designated roads and trails. Big Salt Wash and Coal Gulch (13,440 acres) would be closed to vehicle use from December 1 to May 1 to protect deer on critical winter range. The remainder of the area would be limited to existing roads.

Visual Resources. The cliffs of Hunter/Garvey Canyons (7,600 acres) and the Douglas Pass cliffs (1,920 acres) would be managed under VRM Class

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II objectives. De Beque Canyon (7,040 acres), Baxter/Douglas Pass roads (19,200 acres), and Hunter/Garvey Canyon benches (11,400 acres), and the face of the Book Cliffs (13,000 acres) west of Carpenter Trail would be managed under VRM Class III objectives.

Wilderness. The Demaree Canyon Wilderness Study Area would be recommended to Congress as nonsuitable for wilderness. Following release by Congress, the area would be managed as described for this emphasis area. It would be available for oil and gas and coal leasing with stipulations.

Public Utilities. The Hunter/Garvey Canyons cliffs, Island Acres, the Goblins, the Douglas Pass canyon cliffs, and the unstable soils in the Baxter/Douglas area (26,520 acres) would be identified as unsuitable for public utilities. Threatened and endangered species habitat, scenic and natural values, Demaree Canyon, the remainder of the Hunter/Garvey Canyon, the remainder of the Douglas Pass area, deer and elk winter range, elk calving areas, perennial streams, the Palisade municipal watershed, the Colorado River corridor, and slopes greater than 40 percent would be identified as sensitive to public utilities (170,500 acres).

A half-mile wide corridor would be identified along the existing Mid-America Pipeline Company and the Northwest Pipeline Company routes along West Salt Creek and State Highway 139. The northern ends of these corridors would be determined following additional analysis of pending project proposals. Approval of major utility projects in these areas would result in corridor designation. In addition, a half-mile wide corridor would be designated under this alternative for major power lines in Coal Canyon. Approval of the Public Service Company Grand Valley Conversion project would result in a half-mile wide designated corridor along most of the public lands portion of that project. A major power line corridor (approximately four miles wide) would also be designated under this alternative from the resource area boundary near De Beque to the southern resource area boundary along Highway 50.

Transportation. Public access would be acquired to Barrel Springs, Buniger Road, South Canyon, Douglas Pass East, and Prairie Canyon for general resource management. Administrative access would be acquired from Douglas Pass to Baxter Pass for general resource management. Trail access would be acquired through Hunter Canyon for recreation use. No new roads would be constructed in Hunter Canyon. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest pri-

ority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 10,000 acres would be managed for critical fire suppression (oil and gas facilities, coal outcrops, improvements), and approximately 365,880 acres would be managed for full suppression. Approximately 18,000 acres would be managed for limited suppression. Approximately 12,000 acres would be managed for prescribed burning.

Area Co-1: Emphasis on Oil and Gas

Oil and Gas. Approximately 122,690 acres would be available for leasing with standard lease terms. Approximately 4,570 acres would be available for leasing with a no surface occupancy stipulation to protect the Colorado River corridor and the Pyramid Rock Research Natural Area, and approximately 76,120 acres would be available for leasing with other stipulations to protect scenic and natural values (South Shale Ridge), perennial streams, steep slopes, deer and elk winter range, and threatened and endangered species.

Water. Sediment yield would be reduced from an area south of South Shale Ridge and north of Sulphur Gulch (9,700 acres), and area northwest of Corcoran Wash (3,800 acres), and an area east of lower Roan Creek (3,100 acres). Salinity yield would be reduced from an area south of South Shale Ridge and north of Sulphur Gulch (6,500 acres) and an area east of lower Roan Creek (1,000 acres). Stream channels on two tributaries of Dry Fork (2.5 miles) would be treated.

Locatable Minerals. The entire area would be open to mineral location except for areas closed because of existing withdrawals.

Mineral Materials. Pyramid Rock (470 acres) would be closed to mineral materials sales and free use permits. The remainder of the area would be open.

Forestry. Approximately 4,192 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. The Roan Creek Habitat Management Plan would be revised to allow harvest of pinyon-juniper prior to vegetation manipulations.

Wildlife. Wildlife would continue to be managed primarily for the habitat of mule deer as outlined in the Roan Creek Habitat Management Plan. Disturbing activities would be prohibited in deer and elk critical winter ranges from December 1 to May 1. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This

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would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas to be reserved from treatment would be selected with flexibility to accommodate feasibility. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings.

Threatened and Endangered Species. Approximately 33,500 acres (much of it overlapping) of bald eagle, Colorado River cutthroat trout, and Uinta Basin hookless cactus habitat would be identified for active management and protection. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Active peregrine falcon nests would be protected from surface-disturbing activities from February 15 to July 15. Six miles of Colorado River cutthroat trout stream would be improved and protected. The Uinta Basin hookless cactus sites and the black-footed ferret, if present, would be protected. Any newly found population of the cactus that exceeds 5 percent of the De Beque population would be given a special protective designation. Known important habitat sites of sensitive animal and plant species would be protected from surface-disturbing activities.

Livestock Grazing. The ecological integrity of riparian areas would receive special attention in the implementation of livestock grazing management plans.

Recreation. The entire area would be identified as an extensive recreation management area. South Shale Ridge (22,500 acres) would be managed to provide opportunities for semi-primitive motorized recreation.

Off-Road Vehicles. Vehicle use in the Pyramid Rock RNA (470 acres) and South Shale Ridge (22,500 acres) would be limited to designated roads and trails. In South Shale Ridge, any new industrial roads would be closed to public vehicle use to protect the natural scenic setting. Vehicle use in the remainder of the area would be limited to existing roads.

Visual Resources. South Shale Ridge (22,500 acres) would be managed as a visual resource management Class III area.

Natural Areas. Approximately 470 acres surrounding Pyramid Rock would be designated as a research natural area. Reserving habitat for two plant species, one a sensitive and the other a threatened species, would be the primary purpose.

Public Utilities. The Pyramid Rock Research Natural Area (470 acres) would be identified as un-

suitable for public utilities. South Shale Ridge, threatened and endangered species habitat, known locations of sensitive species, deer and elk winter range, perennial streams, and slopes greater than 40 percent would be identified as sensitive to public utilities (76,120 acres). The remainder of the area would be identified as suitable. A one mile wide corridor would be designated along Roan Creek from De Beque to the Community Center for railroads, power lines, and water and oil and gas pipelines. A one-half mile wide corridor would be designated along Clear Creek from the Community Center to the northern resource area boundary for major power lines and oil and gas pipelines.

Transportation. Public access would be acquired from Carr Creek to Douglas Pass, Middle North Dry Fork, Brush Mountain, Cow Ridge, 4A Mountain, and Horse Mountain for general resource management. Administrative access for forest management would be acquired to Hopple Gulch and Tater Hills. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 135,481 acres would be managed for full suppression, and approximately 5,000 acres would be managed for critical fire suppression (oil and gas facilities, improvements). Approximately 5,000 acres would be managed for prescribed burning.

Area Co-2: Emphasis on Oil and Gas

Oil and Gas. Approximately 55,248 acres would be available for leasing with standard lease terms. Approximately 2,100 acres would be available for leasing with a no surface occupancy stipulation to protect Vega Reservoir recreation site and the Plateau Creek soil slump area, and approximately 37,051 acres would be available for leasing with other stipulations to protect scenic and natural values (Vega Reservoir scenery), perennial streams, steep slopes, deer and elk winter range, Transect 7 archaeological site, and threatened and endangered species habitat.

Water. Sediment yield would be reduced from an area east of the De Beque cutoff road (2,200 acres). Salinity yield would be reduced from an area east of the De Beque cutoff road (900 acres). Approximately 3.2 miles of eroding stream channel would be treated along Sand Wash. The watershed behind the Jerry Creek Reservoirs would be protected from surface-disturbing activities.

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Locatable Minerals. The entire area would be open to mineral location except for areas closed because of existing withdrawals.

Mineral Materials. The area behind Jerry Creek Reservoirs (1,160 acres), Grand Junction municipal watershed (1,240 acres), and Vega Reservoir (2,160 acres) would be closed to mineral sales and free use permits. The remainder of the area would be open.

Forestry. Approximately 1,979 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Fuelwood sales would be designed to benefit wildlife in critical big game winter range.

Wildlife. Wildlife would be managed primarily for the habitat of deer and elk. Management would focus on increasing the percent of big game use on public land in winter. Disturbing activities would be prohibited in deer and elk critical winter ranges from December 1 to May 1. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas reserved from treatment would be selected with flexibility to accommodate feasibility. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Sport fisheries would be maintained in Plateau Creek and two tributaries.

Threatened and Endangered Species. Approximately 24,610 acres (much of it overlapping) of bald eagle and Uinta Basin hookless cactus habitat would be identified for active management and protection. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Uinta Basin hookless cactus sites would be protected from surface disturbance. Known important habitat sites of sensitive animal and plant species would be protected from disturbing activities.

Livestock Grazing. The ecological integrity of riparian areas would receive special attention in the implementation of livestock grazing management plans.

Recreation. The entire area would be identified for extensive recreation management.

Visual Resources. Vega Reservoir (120 surface acres) would be managed under VRM Class II objectives.

Off-Road Vehicles. The Beehive (3,200 acres), Chalk Mountain (6,400 acres), and Sunnyside (4,820 acres) areas would be closed to vehicle use

from December 1 to May 1 to protect deer and elk on critical winter range. Vehicle use during other times of the year would be limited to existing roads and trails.

Transportation. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Public Utilities. The Vega Reservoir area and Plateau Creek slump would be identified as unsuitable for public utilities. Threatened and endangered species habitat, deer and elk winter range, perennial streams, slopes greater than 40 percent, Vega Reservoir watershed, and Transect 7 (a total of 37,051 acres) would be identified as sensitive to public utilities. The remainder of the area would be identified as suitable. A major corridor (approximately four miles wide) would be designated on the west end of this emphasis area for major power lines.

Fire. Approximately 35,500 acres would be managed for full suppression, and approximately 5,000 acres would be managed for prescribed burning.

Area Dp: Emphasis on Wilderness

Wilderness. Four wilderness study areas totaling 149,087 acres would be recommended for wilderness designation pending U.S. Geological Survey/Bureau of Mines mineral reports—Black Ridge Canyons (19,595 acres), Black Ridge Canyons West (54,342 acres), Dominguez Canyon (56,315 acres), and Sewemup Mesa (18,835 acres). The boundaries would be modified to improve manageability and reduce resource conflicts as shown in Appendix I. Following Congressional action, the resources within these wilderness areas would be managed as described under this emphasis area. Note: If these wilderness study areas were not designated by Congress as wilderness, they would be managed as described in Appendix I.

Air Quality. The area would be managed so as not to violate Class II PSD standards.

Water. Watersheds would be restored only where deteriorated soil and hydrologic conditions threatened life, property, or loss of wilderness values and where natural recovery would be unlikely. New or expanded water developments would be allowed only when approved by the President. Existing water structures would be maintained if they were in the public interest or if they had a valid existing right. Primitive means of access would be used wherever and whenever feasible for maintenance of reservoirs. Water quality would be main-

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tained or enhanced consistent with the protection of wilderness values.

Locatable Minerals. All four wilderness areas would be closed to mineral location, except for pre-FLPMA claims determined to have valid discoveries.

Oil and Gas. All wilderness areas would be closed to additional oil and gas leasing pending Congressional action on wilderness recommendations.

Mineral Materials. All areas would be closed to mineral materials sales and free use permits.

Forestry. Approximately 18,479 acres of productive pinyon-juniper woodlands and 562 acres of commercial forest land would be identified as unsuitable for management and harvesting other than to control insects and diseases. (This acreage includes 2,762 acres of productive pinyon-juniper woodland and 17 acres of commercial forest land in the Montrose District.)

Wildlife. Wildlife habitat would be managed to approximate a natural distribution and number of indigenous fish and wildlife. Hunting, fishing, and incidental trapping (where it is not the trapper's sole source of livelihood) would be allowed. Suitable habitat would be maintained for bighorn sheep in the Black Ridge and Dominguez Canyons areas. Riparian habitat in the woody riparian types would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Habitat would be provided for increasing the deer herd in the Dominguez Canyon area from 10 to 30 per square mile.

Threatened and Endangered Species. Suitable habitat would be provided for the relocation of peregrine falcon. It also would be provided for relocation of other endangered species such as bald eagle and bonytail chub.

Livestock Grazing. Livestock grazing would continue at levels authorized prior to wilderness designation. Grazing allotments would be managed as outlined in approved allotment plans. Rangeland improvements would be maintained. Projects proposed in the grazing environmental impact statement and new projects would be reevaluated prior to implementation to determine effects on wilderness values. Trailing of livestock through Big Dominguez Creek would be monitored to eliminate concentration of livestock during trailing. Livestock grazing on the top of Sewemup Mesa would continue to be prohibited. No improvements would be made for livestock access to the Colorado River corridor.

Recreation. Visitor use would be limited to that necessary to provide for use of the area and still

preserve wilderness values. The number of facilities, improvements, and signs would be limited to that necessary to protect wilderness resources or to provide for the health and safety of visitors. A trailhead would be developed in Sinbad Valley to direct use into Sewemup Mesa. In Black Ridge, motorized boats would be allowed to land on the south side of Ruby Canyon, and recreation permits would be issued for commercial recreational uses. Trailheads would be developed at Pollack Canyon, Rattlesnake Canyon, and the head of Knowle's Canyon. Minimum impact camping regulations would be enforced along the Colorado and Gunnison Rivers to protect riparian habitat. A trailhead at Bridgeport would be maintained, and other trailheads would be developed at Dominguez Recreation Site and at Gunnison Gulch for the Escalante area.

Off-Road Vehicles. All areas would be closed to vehicle use. Special permits would be issued for administration of livestock grazing allotments.

Visual Resources. All areas would be managed under VRM Class I objectives.

Land Tenure. Approximately 320 acres of private land and 600 acres of state land within the Dominguez Canyon area would be recommended for acquisition.

Transportation. Roads would be permitted only where subject to valid existing rights or specifically provided for in wilderness management plans. Hiking and horse trails would be maintained to preserve wilderness values. Legal foot access would be maintained at Bridgeport to serve Dominguez Canyon. Administrative access would be provided to Star Mesa. Public trail access would be acquired in Little Dominguez Canyon. Public access would be acquired on the west side of Sewemup Mesa. Administrative access would be allowed in Black Ridge Canyons, in Devil's Canyon, Colorado Ridge, the Bench Road, and Pollack Canyon up from the Colorado River. Public trail access would be acquired over the Pollack, Flume, and Devil's Canyons trails.

Public Utilities. All four areas (149,440 acres) would be identified as unsuitable for public utilities.

Fire. The entire emphasis area would be managed for wilderness fire activities.

Area E: Emphasis on Wild Horses

Wild Horses. The Little Book Cliffs Wilderness Study Area (WSA) lies mostly within this emphasis area and partially within the coal emphasis area Cc. All discussions on management of the Little Book Cliffs WSA are included in this emphasis area.

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The Little Book Cliffs Wild Horse Range would be managed to accommodate a herd of from 65 to 125 wild horses. Livestock grazing would be prohibited. Periodically, wild horses from other areas would be placed in the area to avoid undesirable effects of inbreeding. The existing wild horse range (27,881 acres) would be expanded to 30,261 acres to include approximately 2,380 acres of critical horse winter range. This winter range has been historically used by the horses but was omitted from the original designation. It is also not used by domestic livestock because of the steep terrain.

The Little Book Cliffs Wild Horse Range would be managed as outlined in the wild horse management plan except it would be available for oil and gas leasing and further coal leasing consideration pending further study. Also, Coal Canyon would be designated as a utility corridor for power lines.

Locatable Minerals. Approximately 30,261 acres would be available for mineral location.

Coal. Approximately 26,801 acres would be identified as acceptable for further leasing consideration. (This includes 15,434 acres in the Little Book Cliffs Wilderness Study Area presently identified as unsuitable for leasing pending Congressional action on wilderness recommendations.)

Oil and Gas. Approximately 30,261 acres would be available for leasing with stipulations to protect scenic and natural values in the entire area, wild horse winter range, wild horse foaling area, and deer and elk winter range.

(Note: The Little Book Cliffs Wilderness Study Area (WSA)—recommended under this alternative as nonsuitable for wilderness designation—would be closed to additional leasing pending Congressional action on wilderness recommendations. However, in the interim, existing leases issued prior to the passage of the Federal Land Policy and Management Act (FLPMA) of 1976 would be allowed to develop in this WSA, as discussed under the Protection Alternative. This includes eight pending applications to drill (APDs) of pre-FLPMA leases issued in this WSA. (See discussion of these eight APDs in Appendix E.) Following Congressional action on wilderness recommendations, the Little Book Cliffs WSA would be open to leasing with stipulations.

Mineral Materials. The entire area (30,261 acres) would be closed to mineral materials sales and free use permits.

Forestry. Approximately 6,639 acres of productive pinyon-juniper woodlands would be identified as suitable for management and harvesting. Fuelwood sales would be limited to commercial operators only. Fuelwood sales also would be limited to

30 acres or less and would be designed to meet management objectives for wild horses.

Wildlife. Wildlife would be managed primarily for the habitat for deer. Wildlife management would focus on improving the quality of deer winter forage. Disturbing activities would be prohibited in deer critical winter ranges from December 1 to May 1. Approximately 14 acres of riparian within Jerry and Cottonwood Creeks would be maintained.

Threatened and Endangered Species. Approximately 2,500 acres of peregrine falcon habitat would be identified for active management and protection. Known important habitat sites of sensitive animal and plant species would be protected from surface-disturbing activities.

Recreation. The wild horse area would be managed as an extensive recreation management area.

Off-Road Vehicles. Vehicle use in the wild horse range would be limited to designated roads and trails to protect wild horses and deer on critical winter range. In addition, Coal Canyon would be closed to vehicle use from March 1 to June 30 to protect wild horses during foaling and critical deer and elk winter range. All foot and horseback riding trails and the Adobe and Carpenter Trails would be closed to all vehicular use.

Visual Resources. The wild horse area would be managed as a visual resource management Class III area.

Wilderness. The Little Book Cliffs Wilderness Study Area would be recommended as nonsuitable for wilderness. (Note: Because of existing pre-FLPMA oil and gas leases, this WSA may be impaired prior to Congressional action.) Following release by Congress, the resources within the area would be managed as described under this emphasis area.

Land Tenure. Approximately 966 acres of private property would be recommended for acquisition.

Public Utilities. Coal Canyon (1,280 acres) would be designated as a utility corridor for power lines only. The remainder of the area (28,981 acres) would be identified as sensitive.

Transportation. Public access would be acquired up Corcoran Wash to the wild horse range for general resource management. Trail access would be acquired across the Adobe and Carpenter Trails for wild horse and recreation management. All new industry roads would be closed to public use. Old roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be

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roads in critical areas having a good chance of success in closure.)

Fire. Approximately 27,261 acres would be managed for full suppression, and approximately 3,000 acres would be managed for critical fire suppression (oil and gas facilities, improvements).

Area F: Emphasis on Water

Water. Measures would be taken to reduce sediment yield from approximately 117,000 acres and salinity yield from approximately 133,000 acres in the Grand Valley desert. Severely-eroding stream channels in Hunter Wash (2.6 miles), Big Salt Wash (8.3 miles), and East Salt Creek (15.4 miles) would be treated. The Badger Wash hydrologic study area would be managed to study the effects of surface-disturbing activities on sediment yield (paired watersheds of 685 acres). Salinity control structures in Indian Wash and Leach Creek (approximately 6,000 acres) would be maintained. Surface-disturbing activities that would adversely affect water quality within the municipal watersheds around Juniata and Hollenbeck Reservoirs would be prohibited (1,760 acres).

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Oil and Gas. Approximately 56,263 acres would be available for leasing with standard lease terms. Approximately 25,400 acres would be leased with the no surface occupancy stipulation to protect the Grand Junction municipal watershed, Badger Wash study area, Fruita and Rabbit Valley paleontological sites, Skipper's Island, two actively managed archaeological sites (Transect 7 and Indian Creek), and scenic and natural values (Grand Mesa slopes and the face of the Book Cliffs); and approximately 108,620 acres would be leased with other stipulations to protect scenic and natural values (Mount Garfield, Highway I-70 from Grand Junction to the stateline, Highway U.S. 50 from Grand Junction to Delta, and Grand Mesa slopes south of Watson Draw), steep slopes, Indian Wash dam, deer and elk winter range, and threatened and endangered species.

Mineral Materials. About 23,000 acres would be closed to mineral materials sales and free use permits to protect cultural, paleontological and watershed values.

Paleontology. The Fruita site (280 acres) and the Rabbit Valley paleontological site (280 acres) would be designated as research natural areas and managed for their scientific values. Rabbit Valley would also be managed for educational purposes.

Forestry. Approximately 4,769 acres of productive pinyon-juniper woodlands would be identified as suitable for management. Approximately 150 acres of productive pinyon-juniper woodlands in the Grand Junction municipal watershed and 1,654 acres in the Rabbit Valley area would be identified as unsuitable for management to protect water quality and wildlife values, respectively. Fuelwood sales would be designed to benefit wildlife in critical winter range. Wood sales would be prohibited in nonproductive woodlands in the Grand Valley between the Book Cliffs and Colorado River and between Highway 50 and the Gunnison River.

Wildlife. Wildlife would be managed primarily for the habitat of pronghorn and game birds. Wildlife habitat management would focus on reversing the downward trend in pronghorn populations, establishing new game bird areas and increasing the deer and elk winter forage between Whitewater and Deer Creeks. Disturbing activities would be prohibited in deer and elk critical winter ranges and migration corridors from December 1 to May 1. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas reserved from treatment would be selected with flexibility to accommodate feasibility. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. A location would be identified for a 30- to 60-acre reservoir and marsh to provide habitat for resident and migrant wildlife. This site would be made available for construction and management by appropriate agencies, which could include the Bureau of Land Management, for public use. Sport fisheries would be maintained on the North Fork of Kannah Creek.

Threatened and Endangered Species. Approximately 64,800 acres (much of it overlapping) of bald eagle, spineless hedgehog cactus, and Uinta Basin hookless cactus habitat would be identified for active management and protection. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Two species of threatened and endangered cactus and the endangered black-footed ferret would be protected. Known important habitat sites of sensitive animal and plant species and communities would be protected from surface-disturbing activities.

Livestock Grazing. Intensive grazing systems would be initiated on all allotments in the Grand Valley desert. This would entail additional range projects and some change of grazing use to ensure ground cover, minimize soil loss, and manage for sod-forming species where appropriate. The ecological integrity of riparian areas would receive spe-

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cial attention in the implementation of livestock grazing management plans.

Cultural Resources. The McDonald Creek and Indian Creek archaeological sites (approximately 510 acres) would be actively managed as high value areas.

Recreation. The Grand Valley would be managed as an intensive recreation management area and would include the Grand Valley desert and Rabbit Valley. An area (10,240 acres) between the Book Cliffs and I-70 from 27-1/4 Road east to 32 Road would be identified for intensive off-road vehicle use. This same area and a contiguous area extending 2 miles to the east of Mount Garfield would be identified as a no shooting zone. A second no shooting zone would be identified 1 mile either side of Little Park Road, beginning at the lower end of the road and extending 7 miles to the south. Rabbit Valley would be managed to accommodate group uses such as horseback rides, group campouts, large picnics, archery, and scouting events. Signs and public information materials would be made available to reduce user conflicts and unauthorized activities. Management would focus on providing rural opportunities in the off-road vehicle open area and roaded natural opportunities in the remainder of the desert area. The need for active supervision of recreational uses in the Grand Valley would be addressed in the Grand Valley Intensive Recreation Management Area management plan.

Off-Road Vehicles. The following areas would be closed to vehicle use: McDonald Creek (160 acres) to protect cultural values; Mount Garfield (1,280 acres), to protect scenic values, provide watershed protection and reduce user conflicts; the Badger Wash study area (685 acres), to protect watershed values; the *Cryptantha elata* study site (60 acres), to protect a sensitive plant study site; and the Fruita Paleontological Site (280 acres), to protect paleontological resources. Vehicle use near the Rabbit Valley paleontological site (280 acres) would be limited to designated roads. The area north of I-70 and south of the Book Cliffs from 27-1/4 Road east to 32 Road (10,240 acres) would be open to cross-country vehicle use, including competitive events. Vehicle use in the remainder of the area would be limited to existing roads primarily to protect sensitive watershed values.

Visual Resources. Mount Garfield (1,280 acres) would be managed under VRM Class I objectives. The foreground of I-70 (8,320 acres) and U.S. 50 (5,760 acres) and the cliffs adjacent to Mount Garfield (8,240 acres) would be managed under VRM Class II objectives. The slopes of the Grand Mesa south of Watson Draw (23,040 acres) would be managed under VRM Class III objectives.

Special Management Areas. The Fruita (280 acres) and Rabbit Valley (40 acres) paleontological sites would be designated as research natural areas. The Fruita site would be managed primarily for scientific use and the Rabbit Valley site for educational and scientific use.

Land Tenure. When an application is submitted, the Bureau would work with the FAA and the Walker Field Airport Authority on the potential airport expansion concerning approximately 2,240 acres of public land.

Public Utilities. The Colorado River, Grand Junction municipal watershed, Badger Wash study area, Fruita and Rabbit Valley paleontological sites, Mount Garfield, Skipper's Island, and actively managed archaeological sites would be identified as unsuitable for public utilities. Threatened and endangered species habitat, scenic values, steep slopes, deer and elk winter range, threatened and endangered species, and known locations of sensitive species would be identified as sensitive to public utilities. The remainder of the area would be suitable. A major corridor (approximately four miles wide) would be designated for power lines from the resource area boundary near De Beque to the southern resource area boundary along Highway 50.

Transportation. Public access would be acquired at the north end of 29 and 33 Roads north of I-70 for recreation management. Public access would be acquired on the Mitchell Road for general public use. Administrative access to manage cultural resources would be acquired to the McDonald Creek area. Trail access would be acquired on the south end of the Black Ridge trail to provide access to Colorado National Monument and adjacent public land. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 640 acres in the Hollenbeck Reservoir watershed would be managed for critical protection, and the remainder of the resource area would be managed for full suppression.

Areas Gd: Emphasis on Land Disposal

Land Disposal. A total of 155 tracts containing approximately 27,956 acres would be identified for disposal. Prior to disposal, the resources within these tracts would be managed as described under this emphasis area. Little, if any, funds would be spent for on-the-ground improvements for resource management on these tracts. Mineral estates would

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be conveyed with the surface where mineral values are known not to exist or where retaining the mineral rights would interfere with or preclude nonmineral development of the land which is a more beneficial use of the land than mineral development.

Locatable Minerals. All potential disposal tracts would remain open to mineral location unless previously withdrawn from the general mining laws.

Coal. Any potential disposal tracts that are within the potential coal development area would be acceptable for further coal leasing consideration.

Oil and Gas. Potential disposal tracts (27,956 acres) would be available for leasing for oil and gas exploration and development with standard lease terms.

Mineral Materials. Potential disposal tracts would be identified as open to mineral materials sales or free use permits.

Forestry. Sawtimber and fuelwood harvesting would be allowed to continue pending disposal.

Livestock Grazing. Limited management of rangeland would be allowed to occur. Permittees would be notified 2 years prior to selling grazing lands.

Recreation. Recreation would not be managed in areas identified for disposal.

Off-Road Vehicles. The area would be designated as open to off-road vehicle use.

Visual Resources. Visual resource management objectives would not be adopted.

Public Utilities. All tracts would be identified as sensitive to public utilities. Only right-of-way applications that would not unduly depreciate the tracts' appraised values would be approved.

Transportation. No additional access would be acquired specifically for management of these tracts. Public access would be reserved across these tracts where it would benefit the public.

Fire. The entire emphasis area would be managed for full fire suppression.

Area K-1: Emphasis on General Natural Resource Management

Water. Sediment yield would be reduced on approximately 900 acres in Snyder Canyon.

Locatable Minerals. Mud Springs (40 acres) and Miracle Rock (40 acres) recreation sites and the proposed utility corridor (860 acres) would be closed to mineral location. The remainder of the area would be open except for existing withdrawals.

Oil and Gas. Approximately 91,384 acres would be available for leasing with standard lease terms. Approximately 2,360 acres would be available for leasing with a no surface occupancy stipulation to protect developed campgrounds (Mud Springs and Miracle Rock), two actively managed archaeology sites (Ladder Springs and Sieber Canyon), scenic and natural values (Granite Creek Canyon), perennial streams, and Black Ridge utility corridor; and approximately 26,976 acres would be available for leasing with other stipulations to protect deer and elk winter range, bighorn sheep winter range, scenic and natural values (Granite Creek Canyon), and threatened and endangered species.

Mineral Materials. Mud Springs and Miracle Rock recreation sites (80 acres), cultural sites (335 acres), and the proposed utility corridor (860 acres) would be closed to mineral materials sales and free use permits. The remainder of the area would be open.

Forestry. Approximately 21,573 acres of productive pinyon-juniper woodlands and 317 acres of commercial forest land would be identified as suitable for management and harvesting. Approximately 673 acres of productive pinyon-juniper woodlands in the Pinyon Mesa area and 40 acres in The Falls area would be identified as unsuitable for management and harvesting because of adverse location and recreation, respectively. Fuelwood sales would be designed to meet management objectives for wildlife on big game critical winter range.

Wildlife. Wildlife would be managed primarily for the habitat for deer, elk, and grouse. Wildlife management would focus on decreasing deer and elk winter use in the Dolores triangle and increasing it in emphasis areas A-2 and Dp. Disturbing activities would be prohibited in deer and elk critical winter ranges from December 1 to May 1 and in elk calving areas from May 15 to June 15. Aspen stands and identified calving sites would be protected from surface disturbance within the elk calving areas. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas reserved from treatment would be selected with flexibility to accommodate feasibility. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Sport fisheries would be maintained in Bieser, Briar, and Granite Creeks and in the Little Dolores River.

Threatened and Endangered Species. Active peregrine falcon nests would be protected from surface-disturbing activities from February 15 to July

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15. Spineless hedgehog cactus habitat would be protected. Known important habitat sites of sensitive animal and plant species would be protected from surface-disturbing activities.

Livestock Grazing. The ecological integrity of riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. Sieber Canyon and Dead Indian archaeological sites would be actively managed as high value sites.

Recreation. Miracle Rock recreation site (40 acres) would continue to be managed. Facilities at the Mud Springs recreation site (40 acres) would be expanded to accommodate additional group use. Permits and fees would be required in this area. The remainder of the emphasis area would be managed as an extensive recreation management area. Approximately 15,600 acres in Granite Creek would be managed to provide opportunities for semi-primitive motorized and non-motorized recreation.

Off-Road Vehicles. Vehicle use would be limited to existing roads in the Granite Creek and The Palisade areas.

Visual Resources. Granite Creek Canyon (2,240 acres) would be managed under VRM Class II objectives. The benches above Granite Creek (12,760 acres) would be managed under VRM Class III objectives.

Public Utilities. A one-quarter mile wide corridor would be identified between the Colorado National Monument and the Black Ridge Wilderness Study Area for placement of minor utilities such as waterlines, power lines, and telephone lines. Roads would be prohibited within this corridor. Approximately 26,976 acres would be identified as sensitive to public utilities to protect deer and elk winter range, bighorn sheep winter range, and the mesa tops in Granite Creek Canyon. Approximately 2,360 acres would be unsuitable for public utilities to protect three developed campgrounds, Granite Creek Canyon cliffs, perennial streams, and the three managed archaeological sites.

Transportation. Trail access would be acquired along the south end of Black Ridge in cooperation with Colorado National Monument. Administrative access would be acquired to the Crawford Peak communication site and to Snyder Flats North and South and Timber Ridge for forest management. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 80 acres would be managed for critical fire suppression (Mud Springs and Miracle Rock recreation sites); 15,000 acres would be managed for full suppression; 49,840 acres would be managed for limited suppression; and 2,000 acres would be managed for prescribed burning.

Area K-2: Emphasis on General Natural Resource Management

Water. Sediment yield would be reduced from the Calamity and Blue Creek watersheds (3,300 acres) and three unnamed areas adjacent to the Dolores River (18,000 acres). Eroding stream channels in Bull Draw (3.3 miles), three tributaries to the Dolores River (6 miles), and Calamity and Blue Creeks (4.6 miles) would be treated. The Sinbad salinity control project would continue to be studied and receive priority.

Locatable Minerals. The entire area would be open to mineral location except for those areas closed because of existing withdrawals.

Oil and Gas. Approximately 66,891 acres would be available for leasing with standard lease terms. Approximately 34,240 acres would be available for leasing with a no surface occupancy stipulation to protect scenic and natural values (Sinbad Valley cliff, The Palisade Outstanding Natural Area, the Dolores River corridor, and Juanita Arch); and approximately 53,685 acres would be available for leasing with other stipulations to protect scenic and natural values (Unaweep Canyon), steep slopes, perennial streams, deer and elk winter range, and threatened and endangered species.

Mineral Materials. Approximately 18,000 acres on the Palisade above Gateway, the cliffs of Sinbad Valley, the Dolores River, Unaweep Canyon, Juanita Arch, and Unaweep Seep would be closed to mineral materials sales and free use permits.

Forestry. Approximately 25,795 acres of productive pinyon-juniper woodlands and 252 acres of commercial forest land would be identified as suitable for management and harvesting. Approximately 2,865 acres of productive pinyon-juniper woodlands in the John Brown area and 857 acres in The Palisade would be identified as unsuitable for management and harvesting because of adverse locations. Fuelwood sales would be designed to benefit wildlife in critical winter range.

Wildlife. Wildlife would be managed primarily for the habitat for deer, elk, and turkey. Wildlife management would focus on dispersing the big game winter use more evenly between Blue Mesa and Tenderfoot Mesa. Habitat would be provided for increasing the deer herd from 14 to 30 per square mile in that winter range. Habitat would be provided

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on this side of the Uncompahgre Plateau for the rehabilitation of the wild turkey population. Disturbing activities would be prohibited in deer and elk critical winter ranges from December 1 to May 1. Within vegetation conversion projects, one-fifth of the area (the 20 percent that produces the most fruit) would be excluded from the treatment. This would maintain food for fruit-dependent wildlife. Thirty percent of sagebrush manipulation areas would be retained in leave strips or untreated patches. Areas reserved from treatment would be selected with flexibility to accommodate feasibility. Woody riparian habitat would be maintained to favor the tallest native plant species. Surface disturbance would be prohibited within 100 feet of perennial streams, except at necessary stream crossings. Sport fisheries would be maintained on Lobe, West, North, Ute, Blue, Calamity, and North Fork of Mesa Creeks. The Unaweep Seep Research Natural Area would continue to be managed as outlined in the habitat management plan.

Threatened and Endangered Species. Approximately 28,000 acres (much of it overlapping) of bald eagle and peregrine falcon habitat would be identified for active management and protection. Suitable habitat for the reintroduction of peregrine falcons would be provided in cooperation with the Colorado Division of Wildlife and U.S. Fish and Wildlife Service. Bald eagle concentration areas would be protected from surface-disturbing activities from December 1 to April 1. Active peregrine falcon nests would be protected from surface-disturbing activities from February 15 to July 15. Known important habitat sites of sensitive animal and plant species and communities would be protected from surface-disturbing activities.

Livestock Grazing. The ecological integrity of riparian areas would receive special attention in the implementation of livestock grazing management plans.

Cultural Resources. The Sinbad Valley historical area would be actively managed as a high value historical site area.

Recreation. The Dolores River Canyon would be managed to provide for recreation use (primarily for floatboating, highway oriented sightseeing, and hiking) and protection of natural values. Permits would be required for all commercial floatboating use. Sinbad Valley, the Palisade, the Dolores River corridor, and Unaweep Canyon (including Northwest Creek) would be identified as the Gateway Intensive Recreation Management Area (41,000 acres) and managed to provide opportunities for semi-primitive recreation.

Off-Road Vehicles. The cliffs of Sinbad Valley (1,920 acres), the Palisade Outstanding Natural Area (1,920 acres), and Unaweep Seep Research

Natural Area (37 acres) would be closed to vehicle use. Blue Mesa would be closed to vehicle use from December 1 to May 1 (3,200 acres) to protect deer on critical winter range. Vehicle use in the remainder of the area would be limited to existing roads.

Visual Resources. The cliffs in Sinbad Valley (1,920 acres) and The Palisade Outstanding Natural Area (1,920 acres) would be managed under VRM Class I objectives. The Dolores River corridor (16,000 acres), the cliffs of Unaweep Canyon, Northwest Creek, and Juanita Arch would be managed under VRM Class II objectives. The valley bottoms of Sinbad Valley (8,960 acres) would be managed under VRM Class III objectives.

Wilderness. The Palisade Wilderness Study Area would be recommended as nonsuitable for wilderness. Following release by Congress, the area would be managed as described for this emphasis area. It would be available for oil and gas leasing with stipulations.

Special Management Areas. The Palisade (1,920 acres) would be designated an outstanding natural area to protect scenic values. Unaweep Seep (37 acres) would continue to be designated a research natural area to protect rare butterflies.

Public Utilities. The Unaweep Seep, The Palisade Outstanding Natural Area, the cliffs of Sinbad Valley, and Juanita Arch (34,240 acres) would be identified as unsuitable for public utilities. The valley bottoms of Unaweep Canyon and Sinbad Valley, perennial streams, threatened and endangered species habitat, known locations of sensitive plants, slopes greater than 40 percent, the Dolores River corridor, and deer and elk winter range (53,685 acres) would be identified as sensitive to public utilities. The remainder of the area would be suitable. A half-mile wide corridor would be designated along the Unaweep Canyon road for telephone and small electrical distribution lines.

Transportation. Trail access would be acquired or developed into Bull Draw (.25 mile) for recreation management. Administrative access would be acquired on the Snyder Flats North access for forest management. Roads that no longer serve their primary purpose and that have relatively little value to multiple use management would be closed to protect wildlife. (The highest priority for closure would be roads in critical areas having a good chance of success in closure.)

Fire. Approximately 150 acres would be managed for critical fire suppression (an area adjacent to Unaweep Seep wildlife zone), while approximately 40 acres would be managed for limited fire suppression (areas within the Unaweep Seep wildlife zone). Approximately 147,142 acres would be man-

Preferred Alternative

aged for full suppression, 3,000 acres would be managed for prescribed burning.

feasible and implementable, and these types of alternatives would violate the BLM's legal mandate to manage public land resources on a multiple use, sustained yield basis.

ALTERNATIVES NOT ANALYZED IN DETAIL

Three alternatives in addition to the Continuation of Current Management Alternative, the Commodity Alternative, the Protection Alternative, and the Preferred Alternative were considered but rejected for detailed analysis.

MAXIMUM UNCONSTRAINED ALTERNATIVE FOR PRODUCTION OR PROTECTION

A maximum unconstrained alternative was not considered because no alternatives were considered that proposed maximum production or protection of one resource at the expense of other resources. Alternatives considered in detail must be

REDUCED BUDGET ALTERNATIVE

This alternative was proposed during issue identification. A reduced budget alternative would not adequately respond to issues. This alternative would affect timing and implementation of project proposals rather than resource allocations, which is the primary function of this RMP.

CITIZENS' ALTERNATIVE

A Citizens' alternative was submitted to the area manager in 1984 for his consideration. Because of time constraints, this alternative was not analyzed in detail. However, management proposals were incorporated into the Protection and Preferred Alternatives where appropriate.

CHAPTER 3

AFFECTED ENVIRONMENT

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

Chapter 3 contains a general description of the resources that would be affected by the proposed management actions in Chapter 2. Additional information is available in the Grand Junction Resource Area office. Geology, topography, and noise would not be affected by the proposed management actions and are therefore not described in this chapter. Prime and unique farmlands also are not described because none exist on public land in the resource area.

AIR QUALITY

The existing air quality within the Grand Junction Resource Area is generally typical of undeveloped regions in the western United States; ambient pollutant levels are usually near or below the measurable limits. Notable exceptions in this region include high, short-term concentrations of total suspended particulates (primarily wind blown dust), ozone, and carbon monoxide. In addition, urban portions of Mesa County consistently exceed the particulate standards and approach the carbon monoxide standards. The following summary describes existing air quality regulations in Colorado. A more detailed description of existing air quality may be found in the management situation analysis, available in the Grand Junction Resource Area.

National ambient air quality standards limit the total amounts of specific pollutants allowed in the atmosphere—carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and total suspended particulates. State standards include these parameters but may also be more stringent (i.e., Colorado's three-hour sulfur dioxide standard). These standards were established to protect public health (primary standards) and public welfare (secondary standards). Areas that consistently violate minimum federal standards because of man-caused activities are classified as nonattainment areas and must im-

plement a plan to reduce ambient levels below the maximum pollution standards (Table 3-1).

To protect areas not classified as nonattainment, Congress has established a system for the prevention of significant deterioration (PSD) through the *Clean Air Act Amendments* of 1977. Under this act, areas are classified (Class I, II or III) by the additional amounts of total suspended particulates (TSP) and sulfur dioxide degradation that would be allowed. Colorado has established a similar program limiting additional amounts of sulfur dioxide. Colorado's lands are classified Category I, Category II, and Category III (corresponding to greater permissible levels of sulfur dioxide).

Most of the resource area has been designated a PSD Class II attainment area. An area including Grand Junction and the Grand Valley northwest to Fruita is the Mesa County designated nonattainment area for TSP. Colorado National Monument is a state Category I area and has been recommended for PSD Class I redesignation.

The seven WSAs are managed as PSD Class II areas in accordance with BLM's *Wilderness Management Policy* (*Federal Register* Vol. 47, No. 23, February 3, 1982). Designating any of these WSAs as wilderness would not change the air quality designation from Class II. The State of Colorado has the authority to reclassify these areas, or any other lands, if they wish.

Future development of major emitting facilities within the Mesa nonattainment area will be severely restricted until ambient TSP values are reduced. Given the interest in oil shale development and existing industrial development, it is possible that the entire PSD Class II increment may become fully allocated, precluding further major developments. Continued urbanization will probably lead to increased carbon monoxide, nitrogen dioxide and particulate concentrations unless additional control technologies are applied.

In general, decreasing air quality may lead to more restrictive development, greater health effects, and possible secondary impacts to agriculture tourism. These impacts should be minimized through compliance with air quality regulations.

Chap. 3, Affected Environment

Table 3-1. State and Federal Air Quality Standards

(micrograms per cubic meter)

Pollutant	Averaging ^a Time	Ambient ^b				Increment ^c					
		Federal		Colorado		Federal			Colorado		
		Primary	Sec- ondary	Primary	Sec- ondary	Class I	Class II	Class III	Cate- gory I	Cate- gory II	Cate- gory III
Carbon monoxide	8 hour	10,000	10,000	10,000							
	1 hour	40,000	40,000	40,000							
Lead	Quarterly	1.5	1.5								
Nitrogen dioxide	Annual (Arith.)	100	100	100							
Oxidants (ozone)	1 hour	235	235	^d 160							
Sulfur dioxide	Annual (Arith.)	80				2	20	40	2	10	15
	24 hour	365				5	91	182	5	50	100
	3 hour		1,300	700		25	512	700	25	300	700
Total suspended particulates	Annual (Geom.)	75	60	75	60 ^e	5	19	37			
	24 hour	260	150	260	150	10	37	75			

Sources: (a) *National primary and secondary ambient air quality standards* (40 CFR 50 et seq. as amended January 5, 1983); (b) *Requirements for preparation, adoption and submittal of implementation plans* (40 CFR 51.24, as amended September 3, 1982); (c) *Approval and promulgation of implementation plans* (40 CFR 52.21, as amended June 25, 1982); (d) *Code of Colorado regulations* (Volume 5, Part 14 as amended May 27, 1980).

^aShort-term standards (those other than annual and quarterly) are not to be exceeded more than once each year, except the federal ozone standards. Under federal regulations, the expected number of days with ozone levels above the standard is not to be exceeded more than once per calendar year.

^bAmbient standards are the absolute maximum level allowed to protect either public health (primary) or welfare (secondary).

^cIncremental prevention of significant deterioration (PSD) standards are the maximum incremental amounts of pollutants allowed above the baseline in regions of clean air.

^dThe State of Colorado ozone standard of 160 micrograms per cubic meter was identical to the federal standard when adopted in 1978. The state ceased applying the 160 micrograms per cubic meter standard when the federal standard was revised to 0.12 ppm (235 micrograms per cubic meter). Because the 0.12 ppm standard is not exceeded until 0.125 ppm is measured, the state now recognizes 245 micrograms per cubic meter as the equivalent standard. The Colorado ambient air quality standards have not been revised to reflect this change.

^eThe Colorado annual secondary total suspended particulates (TSP) standard was established as a guide in assessing implementation plans to achieve the 24-hour standard.

SOILS

The Grand Junction Resource Area's soils are described in three separate inventories conducted by the USDA Soil Conservation Service. The *Grand Junction Area, Colorado*, November 1955 inventory primarily covered the irrigated portions of the Grand Valley from Palisade to the Utah-Colorado border between the Redlands and the Highline Canal. *Mesa County Area, Colorado*, published in February 1978 inventoried additional private and public lands within the county. Remaining BLM lands—including the Book Cliffs, Douglas Plateau, De Beque, Parachute and Collbran areas—have been inventoried through a cooperative agreement with the Soil Conservation Service.

Soils information for the resource area exists as published soil surveys and on 1:24,000 scale black and white, quad size photos in the Douglas-Plateau Soil Survey Area. A comprehensive soils overlay (1/2 inch per mile) has also been compiled for the entire resource area. Maps, interpretations for each map unit and a general description of the soils in

the resource area are available in the Grand Junction Resource Area and District offices.

Throughout the resource area, soils on steep slopes (those exceeding 40 percent) are particularly susceptible to accelerated erosion and slumping when deep road cuts or other surface-disturbing activities take place. Soils on approximately 18,000 acres in the Baxter/Douglas Pass area and on 860 acres in the Plateau Creek area have an extremely high slump potential when road and pipeline cuts are made. Surface occupancy or disturbance in these areas should be avoided or limited as much as possible to protect life and property.

Many of the soils on less steeply sloping areas are also highly susceptible to erosion, and management should be designed to reduce erosion and sediment yield. Current erosion rates range from 0.2 to as much as 10 tons per acre per year, depending on soil type, slope, and protective cover (also see Water Quality section, Sediment Yield). Sediment from soil erosion that enters streams and drainages is deposited in ditches and water-holding facilities; the sediment is responsible for much of

Water Resources

the cost of maintenance and for the increased costs of water treatment for domestic consumption.

Soil erosion is continuing to reduce the productive capability of soils in the resource area. Land treatment and erosion or sediment yield control measures should be applied on areas with critical or severe erosion condition that have potential for stabilization and increases in productivity.

WATER RESOURCES

SURFACE WATER

Quantity

The Grand Junction Resource Area lies within portions of five major subbasins in the Upper Colorado River Basin. These subbasins are the upper Colorado River, Gunnison River, Dolores River, Plateau Creek, and Roan Creek. Watershed areas and annual water yield by subbasin are presented in Table 3-2. Public land within the resource area contributes 57 percent of the runoff from the total area or 2.7 percent of the combined flow of the Colorado and Dolores Rivers at the state line.

Table 3-2. Average Annual Water Yield in the Grand Junction Resource Area

Subbasin	Watershed Area (000 Acres) ¹		Annual Water Yield (000 Acre-Feet)	
	Total	Public Land	Total ²	Public Land
Upper Colorado River.....	1,039	710	98.1	67.2
Roan Creek.....	275	141	36.6	13.2
Plateau Creek.....	187	47	35.1	6.8
Dolores River.....	246	189	29.7	21.6
Gunnison River.....	275	194	27.8	19.7
Total.....	2,022	1,281	227.3	128.5

¹Rounded to the nearest thousand acres.

²Includes flow from national forest, state, private, and national park lands within the resource area.

Peak flows on the major tributaries typically occur during May or June in response to snowmelt. Low flows occur in winter when surface runoff is minimal. Intense summer thunderstorms are often responsible for peak flows on the smaller tributaries and are often responsible for severe flooding in localized areas.

Quality

Water quality in the headwater areas of the resource area is generally good, meeting federal water quality standards. In the lower reaches, however, drinking water standards are occasionally exceeded. Parameters such as soluble iron, manganese, sulfates, or total dissolved solids may be in violation.

The major water quality problems associated with the public land are salinity (mineral salts) and sediment. The primary salinity sources are eroding saline soils and saline spring and seep flow. The saline soils, which include Badlands, Billings, Chipeta-Persayo, Uffens, Panitchen, and Dominguez, are derived from Mancos Shale, Wasatch, and Morrison Formations. They exist primarily in the Grand Valley north of the Colorado River, in the lower reaches of Roan Creek, and east of the Gunnison River below the Grand Mesa. Other localized areas of saline soils are scattered throughout the resource area. The saline seeps and springs are located south of Gateway near Sinbad Valley.

The Grand Valley contributes the most salinity. The Bureau of Reclamation estimates 400,000 tons of salt are added to the Colorado River from the valley annually. Dissolution of salt in the Mancos Shale by irrigation return flow from private land accounts for approximately 80 percent. Erosion of highly saline soils from public land also contribute significant amounts of salt. Estimates of salt yield from the desert areas of the Grand Valley range from 0.03 tons per acre per year from the flatter areas to 0.45 tons per acre per year from the steeper, dissected shale badlands.

Several hundred check dams and retention structures have been constructed in portions of the Indian Wash and Leach Creek watersheds within the Grand Valley. These structures detain saline sediment and reduce sediment and salinity yield to the Colorado River from these areas.

Salt Creek, which drains Sinbad Valley near Gateway, is partially fed by very highly saline seeps and springs. Ground water percolating through a buried salt dome in Sinbad Valley emerges as the seeps and springs, enters Salt Creek, and contributes an estimated 8,900 tons of salt per year to the Dolores River.

Sediment yield ranges from less than 0.6 tons per acre per year, typically from the well-vegetated, higher elevation areas, to 8.7 tons per acre which are often lower elevation, south-facing sparsely vegetated slopes with highly erodible soils. Actual sediment yield is generally less than the potential yield because of limited water available to carry sediment. Rill, gully, sheet, and streambank erosion

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are the major vehicles for sediment production. A few of the major sediment producing areas have resulted from past land management, such as off-road vehicle and overgrazing, while other areas are due to natural processes.

Water quality in the resource area is generally declining. This change is due to increasing development causing higher salt and sediment loads and from withdrawals of relatively high quality waters in the headwater area causing less dilution of poorer quality downstream waters.

The Badger Wash study area, located 8 miles northwest of Mack, Colorado, was withdrawn for experimental purposes, scientific research and studies by Executive Order 10355 in 1952. Through the years, studies to determine the effects of grazing management on runoff, erosion, and sediment yield have been conducted.

Portions of three municipal watersheds lie within the resource area. These include the Palisade municipal watershed above the town of Palisade, the Grand Junction municipal watershed above Hallenbeck and Juniata Reservoirs and the Ute Water watershed above the Jerry Creek Reservoirs.

GROUND WATER

Quantity

Ground water is available in limited quantities in both alluvial and bedrock aquifers. Alluvial aquifers are the most important source of ground water in the resource area. They represent 55 percent of the approximately 410 known wells. Alluvial aquifers are associated with streams and can vary greatly in water yield. They are often good sources of water, and most of the shallow wells in the area are in alluvial aquifers. The aquifers are recharged chiefly by streamflow and often serve to recharge underlying bedrock aquifers. They discharge by evapotranspiration, downwards percolation, streams, and wells. The yield varies from a few gallons per minute to 300-400 gallons per minute or more.

There are seven bedrock aquifers within the resource area: the Wingate Sandstone, Entrada Sandstone, Salt Wash Member of the Morrison Formation, Dakota Sandstone-Burro Canyon Formation, Mesaverde Group, Wasatch Formation, and the upper and lower aquifers of the Green River-Uinta Formations. Of these, the Wingate, Entrada, and Wasatch are the source of over 80 percent of the approximately 200 known bedrock wells in the resource area. The bedrock wells are recharged primarily in the outcrop areas by precipitation,

snowmelt, and streamflow percolating into the aquifers. Discharge areas are mainly springs and wells. The prevailing direction of ground water movement in the resource area is northeast. Most of the ground water surfaces far to the north of the resource area.

The yield of bedrock aquifers varies greatly; the Wingate, Entrada, and Dakota Sandstones yield the most, averaging 5 to 30 gallons per minute. The other formations have generally lower permeabilities and have reported yields of 0.5 to 15 gallons per minute. Flowing wells have been reported in portions of the Wingate, Entrada, Dakota, and Salt Wash Member.

Quality

In the alluvial aquifers, quality varies and generally reflects the surface water quality. Some alluvial aquifers such as Big Salt Wash near Fruita exceed state standards for various uses, particularly for drinking water. Surface streams that have quality problems are likely to have their associated alluvial aquifer with quality problems.

Water quality of bedrock aquifers is generally suitable for most uses, with some exceptions. The Dakota Sandstone-Burro Canyon Formation produces poor quality saline waters in portions of the aquifer, due to its marine origins. Also, ground water in Sinbad Valley near Gateway percolates through a buried salt dome and discharges through a series of springs as very saline water. No other significant ground water problems have been reported.

Ground water quality is generally stable with some exceptions. Increased domestic use in the Glade Park and Collbran areas has probably deteriorated those aquifers to some degree. Also, oil shale development in the De Beque area could cause large-scale disruptions in the Green River aquifers and possibly some quality problems in the Wasatch Formation which underlies the Green River.

LOCATABLE MINERALS

Locatable minerals within the resource area include but are not limited to gold, silver, copper, uranium, vanadium, amethyst, gypsum, barite, and calcite. Traces of gold have been found along the major drainages in the resource area, and minor amounts of silver have been reported on the Uncompahgre Plateau. Copper has been located in Sinbad Valley and along mineralized zones in

Coal

Unaweep Canyon. Amethyst has been found in association with the copper in Unaweep Canyon.

Uranium and vanadium were deposited in the Morrison Formation in the Uravan Mineral Belt in the Gateway area. Gypsum, in the form of alabaster, is a bedded deposit in the Moenkopi Formation, which is also in the Gateway area.

More than 50 percent of all the areas claimed have been located for uranium and vanadium; 24 percent are located as pre-1920 oil shale claims, and 10 percent are placer claims along the major river corridors. The remaining areas with claims are located in Unaweep Canyon, and a few are scattered throughout the remainder of the resource area. Many of the claims in the resource area were located prior to July 23, 1955. Any claims located prior to that date do not give the federal government surface rights unless surface rights were acquired later. For example, timber, oil and gas, and rights-of-way cannot be sold on these claims. There has been little production from any of the mining claims within the resource area during the past two years.

The resource area oversees the surface management of four Atomic Energy Commission (AEC) uranium/vanadium leases in the Gateway area even though the surface is located in the Montrose District. Although uranium and vanadium are usually classified as locatable minerals, these areas were previously leased specifically for the development

of uranium and vanadium. The mineral development of these leases is managed by the Department of Energy.

Currently 124,843 acres have been withdrawn for oil shale, classification and multiple use, public water reserves, and recreation and public purposes.

COAL

Based on coal development potential, the Book Cliffs and Grand Mesa Coal Fields are the only areas considered economically feasible to mine within the Grand Junction Resource Area. The coals occur in the Cretaceous Mesaverde Group and are ranked as bituminous. The amount of coal within the fields is estimated to be 4,893 million short tons of measured, indicated and inferred in approximately 371,700 acres with coal resources. This reserve estimate is a composite of several sources. It is based on outcrops, drill hole data and an estimated (Jones et al. 1978) 3,000-foot overburden. The total acreage includes 41,391 acres presently under leases and approximately 34,200 acres along the face of the Book Cliffs that were added to accommodate any surface facilities that might be developed in conjunction with any leases. The average quality of the coal is listed in Table 3-3.

Table 3-3. Quality of Coal Beds in Grand Junction Resource Area

Coal Field	Coal Bed or Zone	Range of Analyses (as-received basis)					
		Thickness (feet)	Moisture (%)	Ash (%)	Sulfur (%)	Btu/lb.	Fus. temp. (degree F.)
Book Cliffs	Carbonera	7.5-3.5	9.2-11.4	7.2-14.4	0.4-0.6	10470-11150	2850
	Cameo	5.5-20.0	5.4-11.5	5.2-15.5	0.5-1.3	10410-12160	2520-2960
	Palisade	2.7-9.3	3.3-14.0	4.9-17.4	0.5-1.6	10950-13560	2130-2910
	Anchor	6.0	8.2-9.8	5.9-9.8	1.0-1.7	11910-12330	2190-2790
Grand Mesa ¹	.....	4.5-14.0	9.8-20.0	21.-16.1	0.5-1.8	9260-11670	2060-2970

Source: Hornbaker et al. 1976.

¹The coals are so similar in composition that one composite analysis can represent all of them (Hornbaker et al. 1976)

Seventeen coal leases, covering 41,391 acres, have been issued within the Book Cliffs and Grand Mesa Fields. Coal unsuitability and multiple-use trade-offs were not applied to those areas currently under lease. Refer to Appendix D for results of application of the coal unsuitability criteria to the remaining areas not leased.

Several of these leases fall within the Little Book Cliffs (1,934 acres) and Demaree Canyon (222 acres) Wilderness Study Areas and the Palisade

municipal watershed (4,000 acres). Leases within these areas, shown on Map 1, were issued prior to the passage of the *Federal Land Policy and Management Act* of 1976. Only one company, Powderhorn Coal Company, is now producing. Production is within the Palisade municipal watershed.

Several coal companies have expressed interest in acquiring additional leases within the Little Book Cliffs Wilderness Study Area. No written expressions have been received regarding the Palisade

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municipal watershed; however, industry has expressed interest in this area.

The entire coal area is either within oil and gas known geologic structures or areas that are classified as prospectively valuable for oil and gas development.

OIL AND GAS

OIL AND GAS OCCURRENCE AND DEVELOPMENT POTENTIAL

The Grand Junction Resource Area contains approximately 1,459,391 acres of federal oil and gas estate. This includes approximately 1,280,060 acres with federally controlled surface estate and 179,331 acres with privately controlled surface estate. Permitting procedures vary between federal surface/federal minerals and private surface/federal minerals as discussed in 43 CFR 3160. Reflecting the potential for oil and gas occurrence in an area, these lands have been classified into one of the following three divisions: (1) known geologic structures (KGSs), (2) prospectively valuable for oil and gas (PV), and (3) not prospectively valuable (NPV). The resource area contains 166,880 acres of KGS, 932,820 acres of PV, and 359,691 acres of NPV.

In addition to oil and gas occurrence classifications, all federal oil and gas estate has been assigned to one of three categories (high, moderate, or low) that reflect the oil and gas development potential. High development potential lands (915,845 acres) include KGS or PV lands in the vicinity of producing wells which are likely to be involved in oil and gas development activities. Moderate development potential lands (183,855 acres) include PV lands with no indication of producible oil and gas and PV lands which are not expected to be involved in oil and gas development. Low development potential lands (391,691 acres) include NPV lands which appear to have no potential for oil and gas development.

CURRENT OIL AND GAS ACTIVITY

Oil and gas leases exist on an estimated 1,082,707 acres (74 percent) of the resource area. Nearly all of the oil and gas activity has occurred on high development potential lands north of the Colorado River and east of the Gunnison River. This area includes the Douglas Creek Arch and the southwestern edge of the broad, synclinal depression of the Piceance Creek Basin. The Douglas Creek Arch borders the basin on the west, and the

Uncompahgre Uplift borders the basin on the southwest. Little oil and gas activity has occurred on the uplift since sedimentary zones there are either nonexistent or too thin for the most part to support sizable oil and gas reservoirs. The management situation analysis (MSA), available in the Grand Junction Resource Area office, contains additional geologic information relating to structure, stratigraphy, and geologic hazards. The MSA also contains a classification of the estimated oil and gas occurrence within the resource area.

As of January 1984, 601 wells had been drilled in the resource area to an average depth of 4,442 feet. The average production from the 176 currently producing gas wells is about 150,000 cubic feet per day per well. The average success rate is about 57 percent. Five oil wells each produce an average of 20 barrels of oil per day. The major production zones are the Dakota and Morrison Formations and the Mesaverde Group.

OIL AND GAS DEVELOPMENT PROJECTIONS

Based on past oil and gas activity (Fig. 3-1), an average of 50 new wells are projected to be drilled in the resource area each year for a total of 1,000 new wells in the 20 years covered by this RMP. Since a certain number of wells must be drilled solely to meet requirements for unitized areas and production, a minimum of 15 wells per year is projected. Drilling activity has historically occurred in boom and bust cycles, which is expected to continue. Each successive cycle has shown a significant increase in the average number of wells drilled per year. During the last boom and bust cycle, from 1976 to 1983, an average of 45 wells per year were drilled.

Most oil and gas activity will probably continue to be concentrated in high development potential areas. The average density of new wells is projected to be about 1 well per section on KGS lands and 1 well per 2 sections on all other high development potential lands. A maximum of 8 wells in any one section is projected. A low level of activity is anticipated on moderate development potential lands. The average density of new wells is projected to be about 2 wells per 36 sections. A maximum of 4 wells in any section is projected. No wells are anticipated on low development potential lands.

OIL AND GAS DEVELOPMENT IN WILDERNESS STUDY AREAS

Included in the acreage currently leased for oil and gas are two wilderness study areas (WSAs)—

Oil Shale

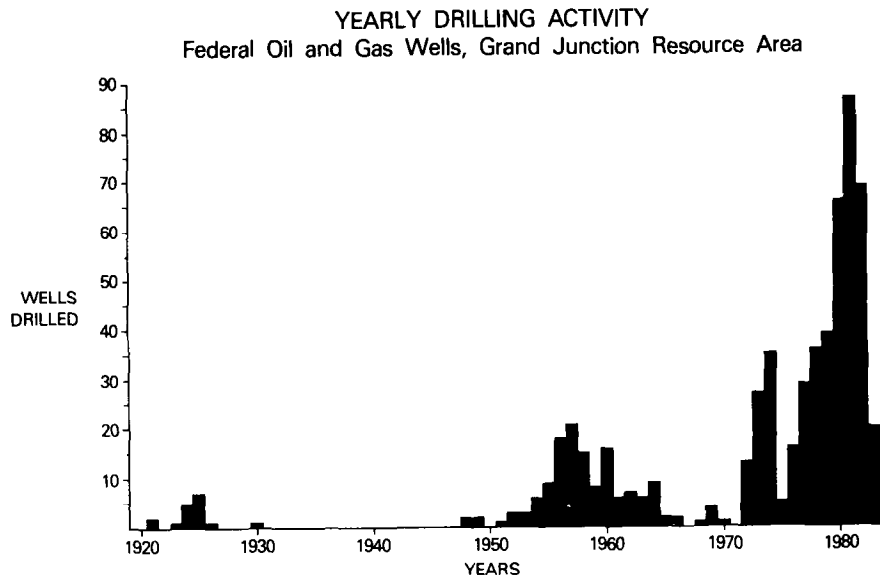


Fig. 3-1

the Little Book Cliffs WSA (26,525 acres) and the Demaree Canyon WSA (21,050 acres). Both WSAs have leases that were issued prior to the passage of the *Federal Land Policy and Management Act* (FLPMA) of 1976. These leases are referred to as pre-FLPMA leases. The Little Book Cliffs WSA contains 60 leases of which 53 are pre-FLPMA covering 85 percent of the WSA. The Demaree Canyon WSA contains 50 leases of which 43 are pre-FLPMA leases covering 92 percent of the WSA. The remaining acreage in both WSAs is covered with post-FLPMA leases (Figs. 3-2 and 3-3).

Based upon FLPMA, the Bureau of Land Management has established an interim management policy (IMP) for lands under wilderness review. This policy allows development of pre-FLPMA leases within WSAs even though the development would impair wilderness characteristics. The development of pre-FLPMA leases, however, cannot result in unnecessary or undue degradation. Because pre-FLPMA leases have valid existing rights, BLM has no option but to approve applications for permit to drill (APDs) on these leases (see Appendix E). Applications for permit to drill on post-FLPMA lease may be approved or denied. However, development of post-FLPMA leases in wilderness study areas must be denied if development would impair the suitability of such areas for wilderness preservation.

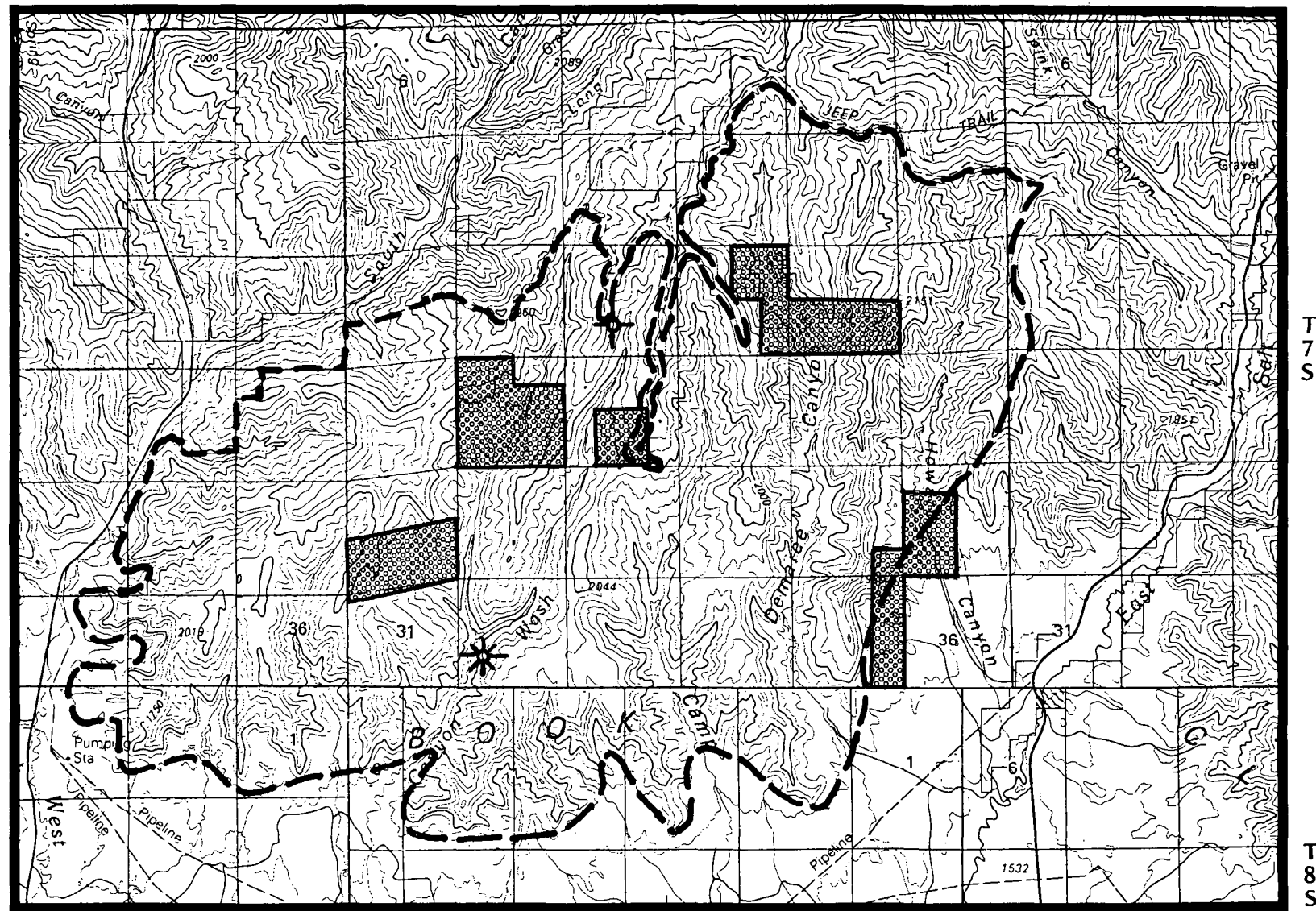
Two wells have been drilled on pre-FLPMA leases in the Demaree Canyon WSA. One well was subsequently plugged and abandoned and the other is producible. Five wells have been drilled on pre-FLPMA leases in the Little Book Cliffs WSA. Two of these wells have been subsequently plugged and abandoned, and the other three are currently shut in.

Ten APDs to develop pre-FLPMA leases within the Little Book Cliffs area are pending approval (Fig. 3-3). Eight of the pending APDs are located in the Little Book Cliffs WSA, one APD is located in the Little Book Cliffs Wild Horse Range but outside the Little Book Cliffs WSA and one is located adjacent to both areas. Detailed descriptions of the ten pending APDs are included in Appendix E. There are no pending APDs in the Demaree Canyon WSA.

OIL SHALE

Vast quantities of oil shale exist within the Piceance Creek Basin in the Green River Formation. However, only a portion of that basin lies within the Grand Junction Resource Area. Much of that area is privately owned. The companies involved in private development are Chevron, Mobil, Pacific, Getty-Cities Services, and Union Oil. The Grand Junction Resource Area's major involvement with oil shale is in the issuing of rights-of-way across public land to the private oil shale reserves and exchanges or sales of public land for private oil shale development. At the present time, the BLM is not considering leasing public oil shale reserves.

More than 200 oil shale placer claims are now located on public land in which the federal government does not have surface management rights. This places an encumbrance on the land and has an impact on the development of other resources (i.e., timber, rights-of-way, oil and gas leasing, and the like).



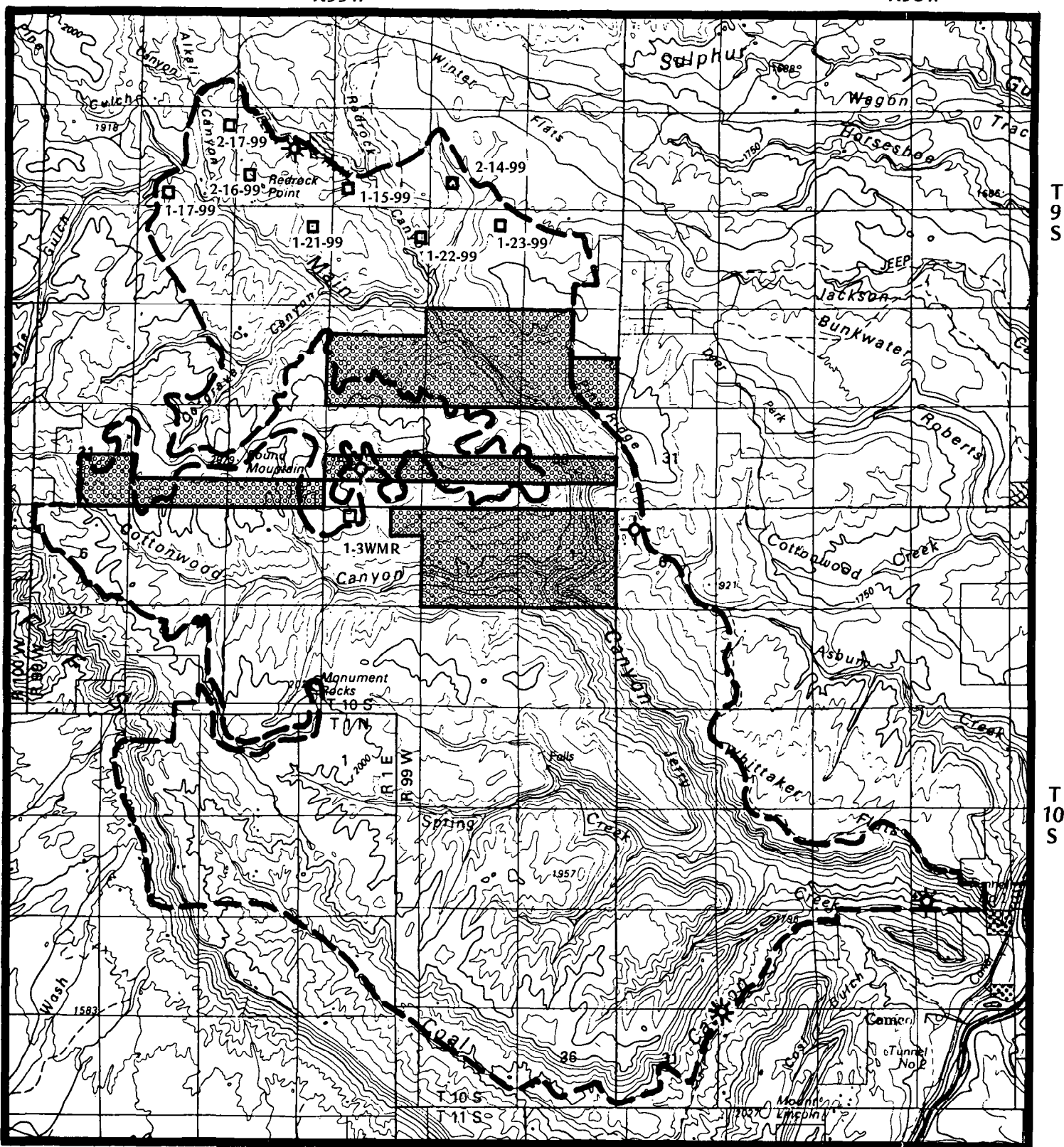
LEGEND

- WSA Boundary
- WSA is All Pre-FLPMA Oil and Gas Leases Except -
- Post-FLPMA Oil and Gas Leases
- * Gas Well (producing, shut in, or temporarily abandoned)
- ⊕ Abandoned Gas Well

1 1/2 0 1 2 3 Miles



Figure 3-2. Oil and Gas Activity, Demaree Canyon Wilderness Study Area.



1 1/2 0 1 2 3 Miles



WSA is All Pre-FLPMA
Oil and Gas Leases Except -

LEGEND

- WSA Boundary
- Post-FLPMA Oil and Gas Leases
- Gas Well (producing, shut in, or temporarily abandoned)
- Abandoned Gas Well
- Pending Application for Permit to Drill

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MINERAL MATERIALS

Mineral materials include, but are not limited to, moss rock, flagstone, basalt, riprap, sand and gravel, red gravel and bentonite. These minerals can be disposed of by free use, usually to other governmental agencies, or by competitive or non-competitive sale.

Moss rock and flagstone can be extracted primarily from the Wingate and Kayenta Formations on the Uncompahgre Plateau, while sand and gravel is located along the major drainages and in alluvium north of the Colorado River and between the Colorado and Gunnison Rivers in the Grand Valley. Basalt boulders are found on the slopes below the Grand Mesa. Bentonitic clay is an expandable clay found in the Morrison Formation south of the Colorado River in the Grand Valley.

Numerous ongoing free use permits have been issued within the Grand Valley for sand and gravel. These have been issued primarily to Mesa County for upkeep of county roads. The need for maintenance of county and state roads and highways remain constant. Therefore, the need for free use permits for sand and gravel is expected to remain the same or increase as roads are upgraded.

Several common use areas have been established in the resource area (Table 3-4) for disposal of mineral materials to the general public. Mineral material disposal to the general public is dependent upon the local economy and has historically been tied to energy development. As more homes are built and remodeled, the need for this resource increases. The need for mineral material is expected to remain constant or decline slightly until the economy improves.

Table 3-4. Common Use Areas in the Grand Junction Resource Area

Location	Mineral
T. 12 S., R.100 W., 6th P.M.	Bentonite
T. 14 S., R. 100 W., 6th P.M.	Flagstone and moss rock
T. 8 S., R. 101 W., 6th P.M.	Red gravel
T. 1 N., R. 3 W., Ute P.M.	Gravel
T. 8 S., R. 98 W., 6th P.M.	Moss rock
T. 3 S., R. 2 E., Ute P.M.	Basalt boulders

Currently 6,188 acres are withdrawn from mineral materials disposal.

One abandoned gravel pit is a unique geologic feature. This site, called the Gunnison Gravels, appears to be an abandoned river terrace. The lithology of the gravels indicates that the Gunnison River

once flowed through Cactus Park and Unaweep Canyon.

Most sand and gravel deposits within the resource area are located on private property. However, free use permits to Mesa County are located near county roads, thereby reducing haul distances. Much of the moss rock, flagstone, bentonite, etc., is located on public land.

PALEONTOLOGICAL RESOURCES

Fossils occur in many of the geologic formations within the resource area. These formations have been classified to indicate the likelihood of significant fossil occurrence (usually vertebrate fossils of scientific interest). The classification system is as follows:

Class IA: Areas where significant fossils have been identified on the ground.

Class IB: Areas that are known or are likely to produce significant fossils that are vulnerable to surface-disturbing activities.

Class II: Areas that show evidence of fossils but are unlikely to produce significant fossils.

Class III: Areas that are unlikely to produce fossils of any kind.

These classifications determine the procedures to be followed prior to the granting of a paleontological clearance to proceed with a project. Class IA areas are protected from surface-disturbing activities; Class IB areas are surveyed prior to surface disturbing activities; Classes II and III are not surveyed. However, mitigation measures are taken to protect any significant fossil found in any formation.

Approximately 433,760 acres have been classified as Class I within the resource area. These acres are primarily within the Morrison and Wasatch Formations. Isolated Class I sites are also found within the Moenkopi, Wingate, Burro Canyon, Mancos Shale and Hunter Canyon Formations.

The Wasatch Formation is important because of the abundance of Eocene vertebrates found within the formation. The fossils include small early horses, birds, rare primates and crocodiles.

The Morrison Formation has produced dinosaurs and early Jurassic mammals. One site within the Morrison, the Fruita Paleontological Site (encompassing 280 acres), has produced not only some of the earliest mammals ever found but also what appears to be adult chicken-size dinosaurs. The Rabbit Valley paleontological site, also within the Morrison, has a nearly complete dinosaur outcrop-

Vegetation

ping onsite. These sites are fragile, and the resource is very susceptible to damage from surface-disturbing activities. The Fruita Paleontological Site is now withdrawn from mineral entry.

VEGETATION

The Grand Junction Resource Area, an area larger than the state of Rhode Island, has the variety of botanical communities expected with elevational ranges from 4,300 to over 10,000 feet. The variety is shown in Table 3-5 as a list of standard habitat sites (SHS). Each SHS incorporates a vegetal and topographical feature in its name. This is done because dominant plant species, when identified with certain landforms in this resource area, usually associate with similar subdominant plant species and wildlife.

Vegetation condition is good, fair, or poor for livestock depending on the percentage of palatable plants in the community. For deer and elk the same is true, but the palatable plants are often different species. For birds, good condition usually refers to the amount of foliage at certain levels that makes vegetation condition good. Good watershed vegetation condition typically results in more vegetation at all levels. Table 3-5 shows vegetation condition based upon livestock range criteria.

The most productive and strategically located vegetation types are the riparian ones. Riparian vegetation grows on the banks of rivers, streams (including intermittent ones), springs and reservoirs in the resource area. To be considered riparian, the vegetation must be visually distinct in growth habit from the vegetation further from the bank. It is usually taller and, if in fair condition, always more luxuriant than adjacent vegetation.

The trend of livestock range and ecological condition has generally been upward since the passage of the *Taylor Grazing Act* in 1934 (Box and Hardesty, 1984).

Much of the riparian type is overgrazed even in grazing allotments well below carrying capacity. Fire, both natural and man-caused, is removing the Fremont cottonwood stands at a greater rate than it is being replaced. This is happening most rapidly on the Colorado River, and this is probably because it has the most acreage to lose. However, riparian areas are very resilient and with improved management they would quickly show improvement.

FORESTRY

Woodland makes up approximately 90 percent (536,084 acres) of all forested land in the resource area (Table 3-6). Pinyon-juniper is the major forest type represented. Gambel oak and cottonwood are also present. Approximately 135,000 acres of the pinyon-juniper type are classified as productive woodland, suitable for management and harvesting on a 180-year rotation (BLM Manual, section 5600). An estimated 2,500 cords of fuelwood are harvested annually through public and commercial sales; an estimated 800 cords are also being harvested without authorization.

The pinyon-juniper type occurs throughout the resource area at elevations between 4,800 and 7,500 feet. Lower elevation stands are primarily juniper, while those at the higher end of the range are mostly pinyon pine. The majority of the stands are approaching or at maturity. Insects and disease are endemic to the pinyon-juniper woodland; black stain root rot is found in several stands in Glade Park, but is not yet a major problem.

The remaining 10 percent of forested land in the resource area is commercial forest land (39,105 acres). Commercial forest land is primarily Douglas-fir, with some aspen, ponderosa pine, and Engelmann spruce-subalpine fir (Table 3-6).

The Douglas-fir occurs throughout the northern part of the resource area, generally on steep sideslopes at elevations between 7,000 and 9,000 feet. Quaking aspen is found in isolated stands above 7,000 feet in areas with a high soil moisture content. Small amounts of ponderosa pine are scattered throughout the southern part of the resource area at elevations between 7,000 and 8,500 feet.

The condition of the commercial forest land is difficult to determine pending completion of the timber production capability classification. The majority of it is in isolated stands on slopes over 60 percent and with no legal access. These stands are considered uneconomical to manage at present or in the foreseeable future, except for Northeast Creek, Snyder Flats, Douglas Pass, and Gateway. Insect infestations are at epidemic levels in some Douglas-fir stands in the Roan Creek drainage, but the infestations are beginning to decline.

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Table 3-5. Standard Habitat Sites of the Grand Junction BLM Resource Area

SHS Name	Some Major Plant Species	Acres Public Land	Condition (%)		
			Good	Fair	Poor
Annual Flats	Cheatgrass, blue mustard, cranesbill, burr buttercup	2,264	0	0	100
Arid Grassland Terraces.....	Galleta, cheatgrass, salina wildrye, broom snakeweed	9,223	22	48	30
Mesic Grassland Highlands	Columbia needlegrass, bluegrass, wheatgrasses, rubber Rabbitbrush.	700	40	40	20
Saltbush Eroded Lands	Nuttall's saltbush, shadscale, salina wildrye	148,324	9	39	52
Saltbush Benches and Bajadas.....	Shadscale, galleta, broom Snakeweed, cheatgrass	28,723	13	57	30
Blackbrush Slopes and Terraces	Blackbrush, pricklypear cactus, blue grama.....	12,189	0	0	100
Greasewood Uplands	Black greasewood, cheatgrass, burr buttercup	13,754	10	60	30
Greasewood Washes.....	Black greasewood, perfoliate pepperwood, cheatgrass.....	12,499	1	26	73
Nonwooded Riparia.....	Salt Cedar, saltgrass, rush, bulrush	13,026	9	29	62
Woodland Riparia.....	Cottonwoods, boxelder, skunkbrush, willow	5,598	18	32	50
Sagebrush Valleys.....	Big Sagebrush, cheatgrass, wheatgrasses, bluegrasses	15,301	5	30	65
Sagebrush Mesas.....	Big sagebrush, black sagebrush, galleta, blue grama	79,343	19	43	38
Sagebrush Highlands.....	Big sagebrush, columbia needlegrass, lupines, gambel oak	6,960	30	45	25
Arid Pinyon-Juniper Steep Lands	Utah juniper, pinyon, galleta, true mountain mahogany.....	431,999	14	48	38
Arid Juniper-Pinyon Mesas.....	Utah juniper, pinyon, big sagebrush, black sagebrush	196,245	15	48	37
Mesic Pinyon-Juniper Steep Lands.....	Pinyon, Utah juniper, true mountain mahogany, serviceberry.....	34,930	17	50	33
Mesic Pinyon-Juniper Mesas	Pinyon, Utah juniper, gambel oak, big sagebrush	58,837	15	48	37
Mountain Shrub Valleys.....	Gambel oak, sedges, saskatoon serviceberry, snowberry.....	7,461	15	55	35
Mountain Shrub Steep Lands	Gambel oak, mountain serviceberry, true mountain mahogany, snowberry.	93,924	40	56	4
Mountain Shrub Bench, Mesa Top and Ridgetop.	Saskatoon serviceberry, sedges, big sagebrush, gambel oak.....	59,624	31	52	17
Aspen Glades	Quaking aspen, mountain snowberry, elk sedge, aspen peavine.	7,503	70	22	8
Ponderosa Pinelands	Ponderosa pine, gambel oak, bluegrasses, sedges.....	10,236	45	37	18
Douglas-Fir Ridge and Valley	Douglas-fir, snowberry, serviceberry	30,885	50	40	10
White Fir Ridge and Valley.....	White fir, aspen, douglas-fir, snowberry.....	512	53	45	2
Total .....	.....	1,280,060	20	47	33

Table 3-6. Acres of Forest Land by Forest Type

Area	Commercial Forest Land				Pinyon-Juniper Woodland		Area Totals
	Aspen	Douglas-fir	Ponderosa pine	Spruce-Fir	Productive	Nonproductive	
Glade Park	572	336	1,069	0	42,933	110,989	155,949
Kannah Creek	0	0	0	0	4,919	6,584	11,503
Dominguez Canyon	0	23	127	65	23,818	26,226	50,259
Gateway.....	56	137	1,139	0	31,171	76,949	109,452
Mount Garfield	18	1,979	0	0	3,310	29,753	35,060
Baxter/Douglas Pass.....	765	7,217	0	44	893	62,996	74,915
De Beque	2,634	21,361	0	418	18,229	59,337	101,979
Collbran	909	17	0	219	6,361	28,566	36,072
Species Total	4,954	31,070	2,335	746	134,684	401,400	575,189

WILDLIFE

TERRESTRIAL WILDLIFE AND WILDLIFE HABITAT

The public land in the Grand Junction Resource Area has a greater variety of wildlife species than any adjacent area. Populations of wildlife, however,

are not high. The inventory (available in the Grand Junction Resource Area office) shows that 382 vertebrate species inhabit the resource area. Big game habitat is managed considering big game population goals set by the Colorado Division of Wildlife.

There are an estimated 11,400 deer and 1,000 elk on the public land in the resource area during the summer and 25,400 deer and 2,800 elk following the hunting season (on winter range)(Colorado

Wildlife

Division of Wildlife 1983). These two species are the dominate wild grazing animals. Only 2 percent of forage use by big game goes to bighorn sheep, pronghorn antelope, and black bears. Table 3-7

shows the assessment of deer and elk ranges, the adequacy of water distribution, the condition and trend of forage, and the condition of cover.

Table 3-7. Deer and Elk Habitat Condition and Trend in the Grand Junction BLM Resource Area

Area and Range	Water Distribution ¹		Forage				Cover Condition ²		Major Population and Habitat Problems
	Sum-mer	Winter	Condition		Trend		Sum-mer	Winter	
			Sum-mer	Winter	Sum-mer	Winter			
Glade Park (Pinyon Mesa).....	F	G	F	F	I	I	G-F	F	Deer use expanding to the north; water limitations here. Use expanding to north and west; overuse in Dolores Triangle.
Kannah Creek		G		P		S		F	Few animals present in summer. BLM chaining too large; poor understory in pinyon-juniper vegetation type.
Dominguez Canyon		F		F-P	I	S		G	Very few acres; chainings too large, but cover filling in; water limitations here. Lower elevations poor in forage—stony pinyon-juniper land.
Gateway.....	P	P	G-F	F-P	S	S	G	F-P	Relatively little summer range; most animals are in Utah, poor distribution of utilization. Poor distribution of utilization.
Mount Garfield to East and West Salt Creeks.	F-P	G	G	F	S	I	G	F	Deer population rebounding and elk increasing; water locally limited. Early spring pasture limiting; narrow canyons concentrate human and animal encounters.
Roan Creek	G	G	F	F-P	S	D	G	G-F	More private land than public and access to public limited. Early spring pasture. Southwest end is private hay field.
Plateau Creek	G	G	G-F	F-P	S	S	G-F	F	More national forest than public; access to public limited. Almost all of range affected by private land—shared daily use

Note: Acreages within the forest types do not agree with those in Table 3-5 because of more stringent forestry criteria. G = good, F = fair, P = poor; I = condition is improving; S = condition is not visibly changing; D = condition is visibly declining.

¹Water distribution is more significant on summer range.

²Cover trend is not shown because the overall trend is improving as a result of aggressive fire suppression, relatively low woodland harvest rates, and stipulations limiting size of clearcuts and pinyon-juniper treatment areas.

Wildlife

The Colorado Division of Wildlife (CDOW) is proposing to increase the deer herd by 17 percent and the elk herd by 3 percent (with decreases in some areas) between 1982 and 1990. Using available harvest records as indices to trends in game and furbearer populations, the following is observed: The elk harvest has steadily been increasing. Mule deer harvests peaked in the early sixties and stabilized in the seventies. Black bear harvests have been stable for the past 30 years. No significant noncyclical changes are visible in these records for small game and furbearers except for kit fox.

The CDOW is establishing two herds of bighorn sheep (one herd west of the Colorado National Monument and another in the Dominguez Canyon area). The CDOW also is restoring a wild turkey population on the Uncompahgre Plateau and proposes to augment the chukar population along the Dolores River. The Utah Division of Wildlife Resources has also been working to increase state-line herds of elk, bighorn sheep, and pronghorn antelope.

Public land contains only a relatively small percentage of big game summer range (12 percent) but provides a major portion of the winter range (70 percent). The latter is considered some of the most critical habitat for management. Table 3-7 points to habitat deficiencies and, thus, opportunities for improvements.

Riparian areas, water development, scattered desert stands of juniper, and taller shrubs, canyons and cliff walls are types of habitat on public land that are of greatest interest to those interested in nongame wildlife study. Pinyon-juniper woodland also contains a unique community of wildlife.

Wildlife management differs according to vegetation types. The desert area is the only habitat in the resource area for pronghorn antelope and the kit fox, and produces the greatest amount of early annual green spring forage for pronghorn, deer, and a few elk. It also provides a rich seed source for large flocks of horned larks and gold, house, and rosy finches. The poor distribution of water is a factor limiting wildlife numbers, and this factor can be improved.

Gambel oak and serviceberry dominate the mountain shrub type; it is the most productive big game forage type and also provides cover for these animals. Twigs and leaves offer browse; and fruits are food for a host of wildlife species, among them band-tailed pigeons, wild turkeys, and bears. Small mammal populations are among the highest in this type, along with the raptors and furbearers that subsist on them.

Approximately one-half of the resource area is in woodland and forest vegetation types which provide the most variety of habitat.

Riparian vegetation types include woodland, shrub, and marshland, all of them having a plentiful water supply. They are highly productive of plant and animal life, but riparian areas are in short supply. Only 2,500 acres exists along perennial streams.

Human activities affecting habitat condition include changes in water distribution and vegetation composition and varying levels of wildlife harassment. Livestock grazing, natural gas exploration and development, and off-road vehicle recreation are the most extensive activities. These affect vegetation composition, although livestock grazing is having a diminishing effect and potentially can have a negligible impact. Gas activities have a temporarily extreme effect, and the off-road vehicle recreation in this resource area is spreading a permanent impact radiating from population centers. These latter two activities generate the most significant levels of harassment to wildlife, particularly in the winter concentration areas of big game.

AQUATIC HABITAT AND WILDLIFE

The desert aquatic arena has the greatest present and potential use by waterfowl. Three major rivers traverse the area, reservoirs are free of ice for a relatively long period, and vision is fairly unobstructed. Rapid sedimentation in water impoundments shortens their useful life and is one of the primary limitations to improving waterfowl habitat in the desert areas.

Ponds, reservoirs, rivers, and streams in the resource area that provide fish habitat are listed in Table 3-8. Eurasian carp, channel catfish, green sunfish, roundtail chub, and flannelmouth sucker are the major river fish species. These are warm-water fish, and only the last two are native species. Streams are considered cold water fish habitat. Cold water fish in the resource area include only four species of trout. The Colorado River race of the cutthroat trout is the only native species. However, it hybridizes with the common rainbow trout, which causes problems in maintaining a pure cutthroat trout population. There are no streams on public land classified as excellent; and only one, Plateau Creek, is periodically stocked. Streams and ponds on national forest and private lands have much greater potential.

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Table 3-8. Sport Fisheries Water in the Grand Junction Resource Area

(On Public Land)

Name	Fish Habitat (stream miles)	Aquatic Condition ^a	Trend ^b
Colorado River	20.0	F	S
Roan Creek	5.0	F	S
Carr Creek	5.0	P-G	I
Brush Creek.....	2.2	P-F	I
Plateau Creek.....	3.6	P-G	S
Spring Creek*	1.1	F	S
Bull Creek	0.25	F	S
Leon Creek	0.5	G	S
East Hawxhurst Creek.....	1.7	G	S
West Hawxhurst Creek	1.6	G	S
Big Salt Wash*	3.0	P	S
East Salt Wash*	5.0	P	S
Little Dolores River.....	4.0	F	S
Bieser Creek*	1.7	P	S
Briar Creek.....	2.9	P	S
Gunnison River	19.5	F	S
Little Dominguez Creek*	14.0	P-F	I
Big Dominguez Creek.....	14.0	P-G	I
Northeast Creek*	3.5	P	S
North Fork of Kannah Creek	1.3	F	S
Dolores River.....	9.8	P	S
North Fork of Mesa Creek.....	2.4	P	S
Blue Creek.....	6.0	P	I
Calamity Creek*	6.5	P	S
West Creek.....	2.0	F-E	I
North Lake Creek	1.5	F	S
North Fork of West Creek	2.7	E	S
Ute Creek*	3.7	F	S
Granite Creek	4.5	P-G	I
Jerry Creek Reservoir No. 1	^c 1.3/24	F	S
Jerry Creek Reservoir No. 2	^c 2.1.85	E	I
Hollenbeck Reservoir	^c 0.2/2.5	G	S
Skipper's Island (2 ponds).....	^c 0.8/10	P	D

Note: Streams marked with an asterisk (*) have marginal and unproven fisheries potential. Further information is available in the Grand Junction Resource Area office.

^aE = excellent, G = good, F = fair, P = poor

^bI = improving, S = static, D = deteriorating

^cReservoirs: miles of edge and acres of surface

THREATENED AND ENDANGERED SPECIES

The federal *Endangered Species Act* lists all threatened or endangered species whose existence must not be jeopardized by any federal action. Federal agencies are directed by the Act to take any actions within their authority to improve the security of the listed species. Also, endangered animal species protected by state laws must not be killed or harassed by any federal action.

The Bureau of Land Management's policy in Colorado extends the same protection to species on either of the federal or state lists and gives special consideration to other species considered rare or sensitive to human actions.

Table 3-9 lists those species identified on federal and state lists as being threatened and endangered in the resource area and other species considered to be in a tenuous position. Animals and plants are ranked separately in terms of probability of extinction. The importance of habitat for these species is the insurance that the diversity and source of genetic material represented by these species and their potential for contribution to scientific knowledge and human enjoyment is not lost.

Three areas, Skipper's Island, Unaweep Seep, and Pyramid Rock, have been widely recognized for their unique value to sensitive, threatened and endangered species. An additional area, Rough Canyon, has been found to have a similar concentration of special concern species. The concentration of these values makes this resource especially vulnerable to surface disturbance in these areas.

Threatened and Endangered Species

Table 3-9. Comparison of Threatened, Endangered, and Selected Sensitive Species in the Grand Junction BLM Resource Area

Species	Rank of Endangerment ¹	Sensitivity to BLM Actions within Resource Area	Status ^a	Remarks
Animals				
Black-footed ferret ³	1	H	E,e	Only one known population (Wyoming); resource area has adequate prey base; two confirmed sighting adjacent Utah.
Bonytailed chub.....	2	L	E,e	Believed extinct in Colorado; one caught in resource area in 1984, known around Lake Mojave.
Whooping crane.....	3	L	E,e	Only one established flock and one experimental flock (which migrates through resource area).
Razorback sucker.....	4	L	2,e	Much less common than squawfish; no evidence of reproduction in upper Colorado River.
Colorado River squawfish.....	5	L	E,e	Colorado, Yampa, White and Green Rivers; habitat in resource area mostly private or local government.
Humpback chub.....	6	L	E,e	Colorado River in resource area has two of the three or four populations.
Peregrine falcon.....	7	H	E,e	Worldwide species, common nowhere, rare mostly; eyries in resource area; 15 in Colorado.
Great Basin silverspot butterfly.....	8	H	1	About 130 colonies in southwestern U.S. and central Mexico; all at small sites; three colonies in Colorado, one in resource area has spring development threatens.
Colorado River cutthroat trout.....	9	M	2,t	Trappers Lake in White River National Forest has strong population; resource area has only one cutthroat stream.
Columbia sharp-tailed grouse.....	10	M	G	In resource area most likely on private land on Pinyon Mesa; possible at Snyder Flats, Haystack Peaks, and in Dominguez area; population down everywhere.
Bald eagle.....	11	M	E,e	About 14,000 in 48 states; Colorado 8-10th ranked; resource area has 1/15 of state population; public land crucial.
Ferruginous hawk.....	12	H	2	Only one nesting pair in resource area; a western hawk most sensitive to disturbance.
Snowy plover.....	13	L	2	Worldwide, in U.S. rare on Gulf and Pacific coasts and declining; also along alkali lakes of the West. Migrate through resource area.
Greater sandhill crane.....	14	L	e	Much if not most of the total population migrates through resource area.
River otter.....	15	L	e	Widespread in northern hemisphere; once extinct in Colorado, recorded at Bridgeport in resource area.
Canyon tree frog.....	16	M	s	Southwest U.S. and Mexico; Black Ridge Canyons WSA at north edge of range.
Kit fox.....	17	H	F	At least a pair per township in the Grand Valley desert; population appears to have suffered from human activities throughout West.
Purple martin.....	18	M	s	Common but dependent on man in East; rare in the West; no nesting found in resource area.
Black-crowned night heron.....	19	M	M	Worldwide; only known heronry in resource area was on BLM island above Fifth Street Bridge; a few better heronries still exist on East Slope.
Western bluebird.....	20	M	M	Widespread throughout West; vulnerable to intensive silviculture.

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Table 3-9. Comparison of Threatened, Endangered, and Selected Sensitive Species in the Grand Junction BLM Resource Area—Continued

Species	Rank of Endangerment ¹	Sensitivity to BLM Actions within Resource Area	Status ²	Remarks
Prairie falcon.....	21	H	M	Western North America; Book Cliffs have the best nesting concentration in resource area.
Golden eagle.....	22	H	B	Widespread in northern hemisphere; vulnerable to shooting and electrocution.
Great basin spadefoot frog.....	23	M	s	Great Basin species; may be common in resource area.
Lewis' woodpecker.....	24	L	M	Rocky Mountains, westward; in cottonwoods and scattered ponderosa pine, threatened by cavity competition with starling.
Great blue heron.....	25	M	M,r	Widespread North America; only one active heronry known in resource area.
Yellow-billed cuckoo.....	26	M	2	Common but declining in East; rare in resource area; none recorded on public land; potentially in Colorado River cottonwoods.
Gray vireo.....	27	M	P	Great Basin species; BLM and Colorado National Monument have most or all in resource area.
Scott's Oriole.....	28	M	P	Southwest U.S. and Mexican species; BLM and Colorado National Monument have most or all in resource area.
Plants				
Uinta Basin hookless cactus.....	1		T	Largest population in Vernal District, De Beque, Plateau Creek, Dominguez, Kannah Creek, and Gunnison River areas.
Spineless hedgehog cactus.....	2	M	E	Moab, Montrose and Grand Junction Districts have total population; Kannah Creek, Whitewater Creek, Dominguez, and Bang's Canyon areas.
<i>Phacelia submutica</i>	3	M	2,s	Total population around De Beque, but not a collector's prize species.
Dolores skeletonweed.....	4	M	2	Dolores River benches; one report in resource area.
Harrington's beard tongue ³	5	M	1	Green River Formation; oil shale development would threaten.
Sedge fescue.....	6	M	2,s	Green River Formation; oil shale development would threaten.
Dragon milkvetch.....	7	M	2,s	Green River Formation; oil shale development would threaten.
Sun-loving meadowcue.....	8	M	2	Green River Formation; oil shale development would threaten.
<i>Cryptantha elata</i>	9	M	2,s	Mancos shale; Grand County, Utah; Kannah Creek, Mount Garfield, and Baxter/Douglas Capability Units.
Grand Junction milkvetch.....	10	M	2,s	Lower elevation sandstone areas between Colorado National Monument and Escalante Creek.

¹Animals and plants are ranked separately. Endangered here is from a worldwide viewpoint.

²E = Federal list endangered species; T = Federal list threatened species; 1 = Federal Category 1 species (insufficient data to list); 2 = Federal Category 2 species (ready for listing); M = Federal Migratory species of high interest; B = Federal Bald Eagle Act protection; e = State (Colorado) list endangered species; t = State (Colorado) list threatened species; s = State (Colorado) list sensitive species; r = Rare species; G = Game species; F = Furbearer species; P = Peripheral species

³Presence in resource area unconfirmed.

Livestock Grazing

LIVESTOCK GRAZING

The 1979 *Grand Junction Grazing Management Environmental Statement* currently guides the resource area grazing management program. Appendix G summarizes the grazing program in the Grand Junction Resource Area.

WILD HORSES

The Little Book Cliffs Wild Horse Range was established by a general management agreement between the livestock operators and the BLM in 1974. The wild horse range is located approximately 10 miles northeast of Grand Junction, Colorado. It encompasses 27,881 acres of which 27,065 acres are public land and 816 acres are private land. An additional 2,230 acres of public land and 150 acres of private land used by the wild horses in the winter-time lie adjacent to the designated wild horse range.

A wild horse management plan was completed for the area in 1979. It states the objectives for this area and the wild horses. The wild horse numbers fluctuate from 65 to 120 head depending on the date of the last roundup. Roundups are generally held every 4 to 5 years to reduce the horse herd to the area's carrying capacity.

The limiting factor for the horse population in the horse area is the forage on the winter range, which is located in Coal Canyon and the upper south-facing slopes of the Book Cliffs. These areas have been identified as critical wild horse wintering areas.

CULTURAL RESOURCES

Historic and prehistoric cultural resources are known to occur throughout the 1,280,060 acres of public land in the Grand Junction Resource Area. Cultural resources Class I, II and III inventories over the past ten years have produced this information. Fourteen hundred sixty archaeological sites representing over 10,000 years of occupation have been identified.

Types of sites that have been located are lithic scatters, hunting sites, kill-butcherer sites, hunting racks, quarry sites, temporary and extended camps, single and multiple habitation sites, pit houses, wickiups, rock shelters, granaries, cists, food processing areas, burial sites, petroglyph and picto-

graph panels, and isolated finds. These sites represent paleo-Indian, Archaic, Fremont and Ute occupations. A variety of historic activities have been documented at 167 sites. Trails, forts, toll and wagon roads, stage stations, hotels, resorts, bridges, homesteads, ranches, railroads, towns, schools, mines, mills, unique structures and sites represent the range of sites that have been recorded. These sites are associated with farming, ranching, mining, commerce, transportation and exploration activities that occurred between the 18th and 20th centuries. Of the known 1,627 cultural resources sites (archaeological and historical), 162 are high priority, eligible for National Register listing, 141 are moderate priority, and the rest are low value, low priority sites.

Twelve sites of the 162 sites that are eligible for listing on the *National Register of Historic Places* have high values amenable for management. These site areas represent a variety of site types and cultural affiliations. These include Paleo Indian, Archaic, Fremont and Ute groups and 18th, 19th and early 20th Century Anglo use. Several are multicomponent sites that evidence long term use or reuse by one or more groups. These areas are Transect 7, Middle Mesa, Indian Creek, Sieber Canyon, Rough Canyon, 10 sites in Gateway, Glade Park, The Dead Indian Site (5 ME 1358), Ladder Springs, McDonald Creek, Sinbad Valley, and Cactus Park.

RECREATION

RECREATIONAL USES

Two-thirds of all recreational use of public land in the resource area occurs in the Grand Valley, close to residential areas. About 90 percent of the recreational use on public land in the Grand Valley originates locally in Mesa County. However, the resource area also attracts visitor use from a much wider area. The most popular recreational uses are listed in Table 3-10. Other recreational activities in the Grand Valley are off-road vehicle competitive events, small game hunting, horseback riding, picnicking, camping, fishing and sightseeing. Total visitor-use in 1983 from these activities was 219,240 visitor days.

Several areas in the Grand Valley have unique geologic or ecological features that attract visitors. Coal Canyon by Cameo, Cactus Park, Little Park Road, Snook's Bottom, and lower Pollack Canyon are in this category. The remainder of the Grand Valley, commonly called the desert, consists of

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Table 3-10. Top Five Recreational Uses in the Grand Valley (1983)

Use	Visitor Days
Off-road vehicle (motorcycle)	60,300
Group Use.....	30,400
Off-road vehicle (four-wheel drives).....	21,300
Target shooting	14,900
Day hiking	13,900

over 100,000 acres of rolling, shale hills. The desert is where most of the off-road vehicle use takes place. As visitor use has increased, so have visitor-use conflicts, primarily those involving reckless shooting and off-road vehicle use.

Many areas on public land outside the Grand Valley provide unique or high quality outdoor recreational opportunities. Table 3-11 lists the top five recreational activities outside the Grand Valley.

Table 3-11. Top Five Recreational Uses Outside the Grand Valley (1983)

Activity	Visitor Days
Big game hunting (deer and elk).....	38,565
Developed recreation site use.....	22,400
Camping, undeveloped sites.....	13,500
Floatboating (river use)	11,500
Hiking (day and overnight)	10,000

Developed Recreation Sites

1. Miracle Rock. Low day and overnight use.
2. Mud Springs. Heavy day use and group picnic site (use often exceeds capacity). Significant overnight use.
3. Dominguez Recreation Site. Moderate day and overnight use. Stream fishing. Trailhead to Big Dominguez Creek Canyon.

Other Agency Recreation Sites with Federal Mineral Estate

Vega, Highline, and Island Acres (administered by Division of Parks and Outdoor Recreation).

Undeveloped Recreation Use Areas

1. Bangs Canyon/Northeast Creeks (40,000 acres). Important backcountry, horse riding, off-road vehicle trail oriented outdoor recreation oppor-

tunities on the doorstep of Grand Junction. High scenic and natural values. Moderate use.

2. Black Ridge/Ruby Canyon Intensive Recreation Management Area (IRMA) (68,000 acres). Outstanding backcountry and riverine recreation. Extensive canyon hiking opportunities. Moderate floatboating use in Ruby Canyon (Colorado River). High quality unique scenic and natural values.
3. Granite Creek (15,000 acres). Remote scenic desert canyon. High quality backcountry opportunities.
4. Gunnison River (15 miles). Attributes suitable for scenic or recreational river designation. Moderate floatboating opportunities in scenic desert canyon.
5. Big and Little Dominguez Creeks (12 miles on each creek). Outstanding scenic canyon hiking opportunities.
6. Dominguez Mesas. Extensive chaining area. Recreation often related to firewood and Christmas tree cutting.
7. Unaweep Canyon (45 miles). Scenic canyon traversing desert to montane settings.
8. The Palisade (2,600 acres). Scenic landscape feature near Gateway, Colorado. Nearby area provides nearly year-round outdoor recreation opportunities.
9. Sinbad Valley (15,000 acres). Highly scenic geologically unique setting.
10. Sewemup Mesa (15,000 acres). The epitome of a large, remote, isolated mesa. Outstanding natural and high scenic values.
11. Dolores River (31 miles). High scenic values. Important riverine recreation and sightseeing along Dolores River Canyon outside canyons (Juanita Arch).
12. The Book Cliffs. Important extensive recreation opportunities.
13. Demaree Canyon (32,000 acres). One of the few remaining areas of high natural values in the Book Cliffs.
14. Hunter/Garvey Canyon (19,000 acres). Relatively untouched canyon system in remote, rugged, scenic Book Cliffs.
15. South Shale Ridge/Coon Hollow (22,500 acres). Unique extensive outstanding display of colorful badlands Wasatch Formation, intricately sculptured hoodoos, monoliths, and other interesting features.
16. Little Book Cliffs Wild Horse Range (27,772 acres). Wild horse range in scenic Book Cliffs.

Off-Road Vehicles (ORV)

17. Roan Creek Drainage-Oil Shale Country. Many areas of moderate to outstanding scenery and general outdoor recreation opportunities. Both physical and legal access restrictions limit public use.
18. Plateau Creek Drainage. Important big game hunting area. Some stream fishing opportunities.

RECREATION OPPORTUNITY SPECTRUM SETTINGS

Recreation opportunity spectrum (ROS) classifications have been made for public land in the Grand Junction Resource Area (Table 3-12 and Appendix H). ROS provides a framework for stratifying and defining classes of outdoor recreation opportunities based on different types of physical, social, and managerial settings. Settings range from easily accessible, highly developed areas with modern conveniences to undeveloped, primitive areas in remote locations. The social character of these settings also range from complete solitude to high density and have varying degrees of recreation management on them. Heavy recreational use in the Grand Valley tends to occur on the closest available public land, regardless of ROS classification. Outside the Grand Valley, ROS classification plays a much more important role in user preference and public recreational demand. The greatest demand appears to be for higher quality scenic landscapes offering semi-primitive motorized, semi-primitive non-motorized, and primitive recreation settings.

Table 3-12. ROS Classification Table

ROS Class	Acres ¹	Percentage of Resource Area in Each Class
Primitive.....	59,458	2.9
Semi-Primitive Non-Motorized	278,253	13.8
Semi-Primitive Motorized	1,084,384	53.7
Roaded Natural	389,275	19.2
Rural.....	149,513	7.4
Urban.....	60,892	3.0
Total.....	2,021,775	100.0

¹Includes all public and private land in the Grand Junction Resource Area.

OFF-ROAD VEHICLES (ORV)

Public land in the Grand Valley provides a large acreage of open desert land that is exceptionally suitable for trail riding, hill climbing, racing, and cross-country travel; ORV use is the single largest recreational use of public land in the Grand Junction Resource Area. Relatively mild winters extend the use season, providing a nearly year-round opportunity for ORVs. Physical and legal access to the public land is close and convenient. In addition, many back roads and trails in the remainder of the resource area provide extensive vehicle use and access opportunities. Table 3-13 shows visitor use days by activity.

Table 3-13. Off-Road Vehicle Use in the Grand Junction Resource Area (1983)

Activity	Visitor Use Days	
	Within the Grand Valley	Outside the Grand Valley
Motorcycle	60,300	5,000
4-Wheel Drive.....	21,300	2,000

Two broad categories of ORV use occur in the resource area—casual (including recreation-oriented use and hunting), and competitive use. A special recreation permit authorizes competitive motorcross races at Cycle Park on 27-1/4 Road, which is also used as a staging area for more extensive desert motorcycle races held east of the area.

Off-road vehicle use is presently closed or restricted in the following locations (see ORV Glossary).

1. The Beehive Road near Mesa, Colorado, is closed seasonally (December 1 to May 1) to protect elk winter range. Industrial use by energy companies is provided for; however, no winter drilling is allowed (1,280 acres).
2. The Divide Road east of Douglas Pass is closed seasonally (October 1 to June 1) to vehicles over 12,000 pounds to protect the road surface.
3. In conjunction with the U.S. Forest Service, the county road to the Dominguez Recreation Site is closed late fall through spring to protect the wet road surface from vehicle damage. Closure dates depend on weather conditions (1,280 acres).
4. The Lands End chainings (1,920 acres) have a seasonal closure in conjunction with the U.S.

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Forest Service to protect big game winter range (no motorized vehicles December 1 to April 30).

5. A fenced 100-acre sensitive plant study site, located in the Whitewater Hill area, is closed to vehicle use.
6. The Unaweep Seep Research Natural Area (37 acres) is physically closed to vehicle use to protect sensitive wildlife and plant habitat.
7. About one-half mile of road leading to the Rattlesnake Canyon arches is closed to protect recreation values.

Off-road vehicle use in the resource area is also the single greatest cause of visitor use conflicts, relating primarily to ORV noise, use next to residential areas, degradation of scenic values, safety, and a reduction in opportunities for non-motorized recreational opportunities. Off-road vehicle use also conflicts with management of other resources, particularly soils (erosion), and wildlife.

Off-road vehicle use is not always consistent with off-road vehicle designations. For example, vehicle use may be allowed in a designated wilderness area in accordance with BLM's *Wilderness Management Policy* or vehicle use may be allowed off designated roads if that use has a prior right or is given that right through a lease or other agreement. However, the off-road vehicle designations would apply to the general public where no special right exists.

VISUAL RESOURCES

Visual resources in the Grand Junction Resource Area have been classified according to visual resource management analysis criteria, BLM Manual 8400 (see Glossary). Visual quality, sensitivity, and public visibility are considered, resulting in a visual resource management classification of I, II, III or IV. Class II areas are the most sensitive, unique, or scenic areas; Class IV areas are the least scenic or sensitive landscapes (Table 3-14). Class I areas are those designated for special, highly restrictive visual resource management.

The visual resources are often the dominant resource value involved in providing high quality outdoor recreational opportunities. Areas with high visual resource management importance include the Dolores, Colorado, and Gunnison River corridors, major highway routes (I-70, Highways 50, 139, and 141), Baxter Pass, Unaweep, Bang's and Dominguez Canyons, Black Ridge Canyons, Mount Garfield, the face of the Book Cliffs, slopes of Grand Mesa, Granite Creek, Hunter/Garvey Can-

Table 3-14. Visual Resource Management Classes Inventory

Class	Acreage ¹	Percent of GJRA
II.....	672,194	33
III.....	320,576	10
IV.....	1,029,005	51

¹Includes all public and private land in the Grand Junction Resource Area.

yons, South Shale Ridge, Sinbad Valley/Sewemup Mesa, and the Roan Creek oil shale country.

WILDERNESS VALUES

In BLM's *Intensive Wilderness Inventory* completed in November 1980, seven areas in the Grand Junction Resource Area were determined to possess wilderness characteristics thereby qualifying as wilderness study areas (WSAs). These are Demaree Canyon (CO-070-009), Little Book Cliffs (CO-070-066), Black Ridge Canyons (CO-070-113), Black Ridge Canyons West (CO-070-113A, UT-060-116/117), The Palisade (CO-070-132), Dominguez Canyon (CO-070-150, CO-030-363) and Sewemup Mesa (CO-070-176, CO-030-310A). Black Ridge Canyons West WSA extends into the Moab, Utah, District and Dominguez Canyon and Sewemup Mesa WSAs extend into the Montrose District.

The Demaree Canyon WSA (21,050 acres), located 25 miles northwest of Grand Junction in Garfield County, is a series of deep canyons and ridges trending north and south from the Book Cliff escarpment whose base generally forms the southern boundary of the unit. Vegetation is scattered pinyon-juniper and dense mountain brush on the higher elevations and sagebrush and saltbush in the lower elevations. Imprints of man are minimal in the unit except for where oil and gas wells and roads have disturbed the naturalness of the unit. All leases under development were issued prior to the wilderness study area designation and, therefore, have valid existing rights which allow development. This WSA's pre-FLPMA oil and gas leases cover about 92 percent of the area (Fig. 3-2). There are no pending APDs. Also, there are 222 acres of a post-FLPMA coal lease in this WSA. The Bucy gas well and access road have impacted the naturalness of the lower mile of Dry Canyon Wash on the southwestern side of the unit. The Belco well on the extreme northern edge of this unit was a dry hole. Its drill pad has been recontoured and revegetated.

Wilderness Values

The highly dissected topography caused by the series of canyons and ridges provide outstanding opportunities for solitude. Outstanding opportunities for primitive and unconfined recreation are not present in the unit. There are no known special features. The naturalness of the WSA is declining in the general area of oil and gas development and the wilderness character has been lost in lower Dry Canyon Wash.

The Little Book Cliffs WSA (26,525 acres), located three miles north of Grand Junction in Mesa County, is characterized by deep canyons and mesas. Part of the southern boundary is the 2,000-foot high face of the Book Cliffs. Vegetation in the canyons consists primarily of grasses and shrubs. Pinyon-juniper woodlands dominate most of the upland area. Imprints of man are generally lacking except along the periphery where oil and gas development has affected the WSA's naturalness. All oil and gas leases under development were issued prior to the wilderness study area designation and, therefore, have valid existing rights which allow development. Eighty-five percent of the WSA has pre-FLPMA oil and gas leases (Fig. 3-3). There are 8 pending applications for permit to drill (APDs) in this WSA (Fig. 3-3). Several post-FLPMA coal leases totaling 1,934 acres are also in the WSA. Five wells have been drilled in the Little Book Cliffs WSA, two of which have been plugged and abandoned. Of the three potentially producible wells, two are shut-in gas wells which have never produced, and one is a producing well. These wells and their associated roads have impacted wilderness values in this WSA. The producing Koch well and road near Red Rock Point in the northern part of the unit have impacted naturalness and diminished opportunities to experience outstanding solitude and outstanding primitive and unconfined recreation. Similar impacts exist on lower Main and Coal Canyons where shut-in wells have been developed by Coors. The well in Coal Canyon did not require a new road, but the well in Main Canyon required a mile and one-half of new road including a 40-foot cut through a low ridge separating Coal and Main Canyons. This new road construction created a major impact on naturalness in lower Main Canyon.

The WSA's overall size, wild horse herd, scenic beauty, and topographic diversity provide outstanding opportunities for solitude and primitive recreation. Outstanding opportunities exist in the WSA for horseback riding, hiking, backpacking, photography, scenic viewing and viewing of wild horses. The naturalness of the WSA is declining in the general area of oil and gas development. The wilderness character has been impaired by gas wells and roads.

Black Ridge Canyons (18,150 acres) and the Black Ridge Canyons West (54,290 acres) WSAs consist of four WSAs. They are located ten miles west of Grand Junction in Mesa County and in Grand County, Utah. For purposes of analysis three WSAs (two in Utah and one in Colorado) were combined to form one unit. The combined WSAs are referred to as Black Ridge Canyons West. The Black Ridge Canyons and Black Ridge Canyons West WSAs are separated by the Ute Trail, the Colorado Ridge roads, and private land along the Colorado River.

These areas are dissected by deep canyons that drain the northern terminus of the Colorado Plateau. A high ridge spans the southern portion, and the Colorado River forms the northern boundary of the WSAs. Vegetation consists of an open pinyon-juniper woodland with occasional clearings of sagebrush, grasses and grassy meadows, pinyon-juniper, and riparian species such as willow and cottonwood. These WSAs are generally free of the imprints of man. Several range projects and a few structures had a minimal affect on the WSAs' naturalness.

Topographic diversity, unusual landforms such as arches and spires, and spectacular canyons provide for outstanding hiking, backpacking, floatboating, fishing, sightseeing, and other activities. Topographic diversity together with the unit's large size and configuration combine to provide outstanding solitude. A rare butterfly, two endangered fish (Colorado River), a concentration of natural arches, and cultural and paleontological values supplement the WSAs' wilderness values.

The wilderness characteristics of the WSAs are stable. Off-road vehicle travel in the area of the Rattlesnake Canyon arches forced an emergency closure in 1984 to protect the area's naturalness.

The Palisade WSA (26,050 acres) located north of Gateway in Mesa County, is characterized by vertical cliffs, rugged canyons and rolling to flat desert valley bottoms dissected by gulches. Vegetation ranges from pinyon-juniper and desert shrubs in the lower elevations to aspen and ponderosa pine in some of the upper drainages. Grasslands, intermixed pinyon, juniper and oak brush comprise the vegetation of the upper elevations. Although there are several imprints of man within the WSA, it is primarily natural in character.

Heavy vegetation and the many gulches and drainages in the lower elevations help to provide outstanding opportunities for solitude. The WSA's rugged, varied landscape and diversity of flora provide outstanding opportunities to hike, backpack, sightsee, and study nature. The WSA's geologic

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features and a rare butterfly supplement the unit's wilderness values.

The wilderness characteristics of the WSA are generally stable. Some ORV use in the eastern wing of the WSA is removing vegetation and creating new trails in drainage bottoms.

Dominguez Canyon WSA (75,800 acres), is located 13 miles west of Delta in Mesa, Delta and Montrose Counties on the eastern flank of the Colorado Plateau. It is principally made up of the Big and the Little Dominguez Canyons, which have helped form isolated northeast-southwest trending mesas. Vegetation ranges from riparian vegetation and Douglas-fir in the canyons to pinyon-juniper woodlands with sagebrush parks on the mesas. Overall, the WSA is generally free of the imprints of man. Some range projects and two-wheel tracks and revegetating trails are present, but their impact on naturalness is minimal.

The rugged and scenic nature of the area's canyons and mesas provide outstanding opportunities for solitude and primitive and unconfined recreation. Outstanding recreation activities include hiking, horseback riding, cross-country skiing, photography, and sightseeing. Geologic features, paleontological values, cultural values, and rare and endangered plants supplement the WSA's wilderness values. The wilderness characteristics of this WSA are generally being maintained.

Sewemup Mesa WSA (19,140 acres) is located about 10 miles south of Gateway in Mesa and Montrose Counties and consists of two prominent topographic features: the sloping mesa top of Sewemup Mesa and the eastern fringe of the collapsed salt dome of Sinbad Valley. Sewemup Mesa is an isolated mesa top with sheer cliff faces and shallow canyons. Pinyon-juniper woodlands dominate the top, and a combination of pinyon-juniper woodlands, sagebrush flats, and grassy meadows are present in the valley. The WSA is natural in character. One oil and gas well and access road were built in the unit but have a minimum impact on naturalness.

Outstanding solitude is created by topographic and vegetative screening and a canyon system that helps to disperse people. The highly scenic landscape helps to provide outstanding opportunities for hiking, backpacking, scenic viewing, nature study, and technical rock climbing. The mesa's rich history, and geologic and ecological values supplement the WSA's wilderness values. The wilderness characteristics of the WSA are stable.

SPECIAL MANAGEMENT AREAS

Special management areas addressed in this plan consist of areas of critical environmental concern (ACECs), research natural areas (RNAs), and outstanding natural areas (ONAs). Areas considered for management under the special management areas concept possess some type of resource or resources that may warrant special management attention. All such areas could be designated as special management areas pursuant to 43 CFR 1610 or 43 CFR 2070.

The Colorado BLM special management areas program is operated in conjunction with the State of Colorado Natural Areas Program (CNAP). When Colorado BLM designates a site a special management area (RNA, ONA, or ACEC), the State of Colorado may designate it a state natural area.

Presently, the Grand Junction Resource Area has one designated RNA—the Unaweep Seep. The Unaweep Seep has been designated a Colorado natural area. It is one of three habitats in Colorado for the Great Basin silverspot butterfly.

A number of other sites in the resource area have been identified as potential special management areas. Two of these sites (one in the De Beque area and the Fruita Paleontological Site) have already been placed on the state natural areas register. The potential sites and the values present are listed in Table 3-15.

Table 3-15. Sites with Potential for Special Management Area Designation

Location of Site	Values Present
De Beque area.....	A concentration of Uinta Basin hookless cactus and <i>Phacelia submutica</i> are present here.
Fruita area	The Fruita Paleontological Site contains both dinosaur and mammal fossils. Archaeological resources in these areas are of <i>National Register</i> quality.
Indian Creek, Cactus Park, and Rough Canyon areas.....	
Skipper's Island.....	This island contains one of the largest concentrations of riparian habitat on public land in the resource area.
Badger Wash hydrologic study area	Two sensitive plants (<i>Cryptantha elata</i> and Grand Valley buckwheat) and a plant association (Gardner's saltbrush/salina wildrye) are found here.
Rough Canyon area	A concentration of spineless hedgehog cactus (a threatened and endangered plant species) is located in this area.

Land Tenure

Table 3-15. Sites with Potential for Special Management Area Designation—Continued

Location of Site	Values Present
Baxter/Douglas Pass Area and Cactus Park	Soils in the Baxter-Douglas Pass area are prone to slumping and could threaten life or property. Soils in Cactus Park are highly susceptible to erosion; they have a good potential for reestablishing protective vegetation and reducing high sediment yield rates.
South Shale Ridge, Rough Canyon, slopes of Grand Mesa, The Palisade, and Mount Garfield. Unaweep Canyon	These are highly scenic or visually sensitive areas.
Rabbit Valley	The Gunnison Gravels provides evidence that the Gunnison River once flowed through Unaweep Canyon. A deposit of dinosaur fossils in Rabbit Valley has exceptional scientific and educational values.

LAND TENURE

The majority of the public land in the Grand Junction Planning area is in large blocks suitable for multiple use management. Various isolated tracts of public land are located in the Collbran, Kannah Creek, Glade Park, and De Beque areas. Private land is generally located along rivers and valley floors. This settlement pattern is primarily due to the Homestead Acts.

The highest management priority in the lands program has been to process applications for energy-related rights-of-way. Most of the 100 to 150 applications processed each year are for energy-related programs such as oil and gas, coal, oil shale, and electrical power transmission. This trend is expected to continue. Approximately seven hundred fifty right-of-way authorizations are recorded in the Grand Junction Resource Area office. The majority of these rights-of-way are located in the Baxter/Douglas Pass, De Beque, and Collbran areas. Other land use authorizations include nonenergy related rights-of-way cases and other lands cases which are processed as the second priority when time and funding allows.

Applications to lease tracts of land under Section 302 of FLPMA for energy-related uses are received each year; this is expected to continue. The number of these applications is highly dependent on energy development plans and the economy.

Applications for land use authorizations are evaluated and processed on a case-by-case basis as required by BLM regulations. All authorizations approved include stipulations to mitigate any adverse impacts associated with project development.

Current management emphasis under the land tenure program is generally to retain public land in federal ownership; therefore, no sale proposals are under consideration at this time. Because of the priority on energy-related casework, little emphasis has been placed on processing exchange propos-

als. The BLM has received about 35 general inquiries from individuals interested in purchasing public land.

Within the past year, three preliminary exchange proposals and ten sale proposals have been received from individuals interested in acquiring public land. These proposals involve public land parcels ranging in size from less than 2 acres to about 500 acres.

The State of Colorado has filed a State Indemnity Selection (SIS) application to acquire about 3,466 acres of public land in the Grand Junction Resource Area. Two hundred forty acres east of Walker Field Airport and 958 acres of public land near Mack, Colorado, have been transferred. The 2,268 acres remaining in the SIS application are under evaluation.

Municipal waste disposal is currently managed by authorizing the counties to operate sanitary landfills on public land leased under the Recreation and Public Purposes Act (R&PP). Mesa County is the only county in the Grand Junction Resource Area with a recreation and public purposes lease for landfills. Mesa County operates one sanitary landfill and a transfer station under R&PP leases. The county is in the process of cancelling two other recreation and public purposes leases for old landfills no longer needed. Mesa County anticipates an increase in population and, therefore, more demand for municipal waste disposal sites. The Mesa County Waste Management Plan approved in February 1983 indicates that the demand will be primarily for more transfer stations with the possibility of another landfill site. BLM anticipates that suitable public land can be identified to meet the future needs of the counties.

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SOCIAL AND ECONOMIC CONDITIONS

POPULATION

The Grand Valley has long been the transportation, communications and service center for western Colorado and eastern Utah. Mesa County is consequently the most populous in western Colorado and will likely remain so. About 90 percent of the county population lives in the Grand Valley between Palisade and Loma.

Until the 1970s, population growth lagged behind the state average. After 1970, however, the rate of growth increased, averaging just under 7 percent a year between 1977 and 1980 (Table 3-16). Most of the increase was due to immigration brought about by the development of energy minerals. Population growth came to an abrupt halt in 1982 with the closure of several large oil shale projects (most notably the Colony Shale Oil Project) and the concurrent slow down in development of other energy fuels. Since then, population has actually declined and is currently significantly less than the 1982 peak of perhaps 93,000.

Table 3-16. Population: Mesa County and Municipalities

	1970 Census ¹	1977 Census ²	Annual Percent Growth Rate (1970-77)	1980 Census ¹	Annual Percent Growth Rate (1977-80)	1983 Estimate ³	1990 Low Projec- tion ³	2000 Low Projec- tion ³	1990 High Projec- tion ³	2000 High Projec- tion ³
Mesa County	54,374	66,848	3.0	81,530	6.8	87,944	93,276	96,277	105,837	123,870
Collbran	225	293	3.8	344	5.5	348	348	342	353	392
De Beque	155	264	7.9	279	1.9	350	368	379	798	1,655
Fruita	1,822	2,328	3.6	2,810	6.5	3,079	3,206	3,338	4,655	6,002
Grand Junction	20,170	25,398	3.3	28,144	3.5	30,693	32,827	33,776	37,151	43,318
Palisade	874	1,038	2.5	1,551	14.3	1,808	1,844	1,867	2,522	3,740
Unincorporated	31,128	37,527	2.7	48,402	8.9	51,666	54,683	56,575	60,358	68,763
Colorado	2,209,596	2,625,308	2.5	2,889,964	3.3					

¹Colorado State Demographer's Office (1981).

²U.S. Bureau of the Census (1979).

³Mobil-Pacific Oil Shale DEIS, Mountain West Research—Southwest.

The magnitude of future population growth is highly dependent on the degree to which western Colorado energy fuel resources are developed. The low projections included in Table 3-16 assume no significant energy development, in which case annual growth is expected to be less than 1 percent. The high projections are based on a relatively active level of energy development (about 400,000 barrels per day of shale oil) and result in average annual growth in excess of 2 percent, a rate similar to that of the early 1970s.

County demographic characteristics—age, age and sex distribution, and average household size—are not significantly different from state averages. The ethnic composition of the area is predominately white. Population per square mile of private land is closer to that of counties in the Denver suburban area (perhaps 90 persons per square mile).

THE ECONOMY

Employment in three sectors—retail trade, services, and government—makes up almost 60 percent of Mesa County's total wage and salary employment, reflecting the county's role as western Colorado's trade and service center. The local economy is more diversified, however, than other western Colorado counties since the mining, manufacturing, and construction sectors each maintain significant shares of total employment (Table 3-17). During the period of 1977-82, the sectors with greatest growth have been mining, construction, and finance, insurance, and real estate (FIRE).

Social and Economic Conditions

Table 3-17. Employment by Type and Broad Industrial Sectors for Mesa County, 1977-1982

Employment by Place of Work	Mesa County ^a						Average annual percent growth 1977-82
	1977	1978	1979	1980	1981	1982	
Total employment ^b	31,562	33,987	36,269	38,503	41,951	42,301	6.7
Number of proprietors.....	4,572	4,782	5,025	5,316	5,381	5,496	3.8
Farm proprietors.....	1,354	1,329	1,295	1,304	1,301	1,274	-1.2
Nonfarm proprietors.....	3,218	3,453	3,730	4,012	4,080	4,222	5.6
Total wage and salary employment.....	26,990	29,205	31,244	33,187	36,929	38,241	7.2
Farm.....	562	562	444	590	577	574	0.4
Nonfarm.....	26,428	28,643	30,800	32,597	36,352	37,667	7.3
Private.....	21,407	23,513	25,441	27,105	30,545	31,420	8.0
Agricultural services, forestry, fishing, and other ^c	108	82	90	116	134	197	12.8
Mining.....	1,095	1,251	1,729	2,353	2,661	2,409	17.3
Construction.....	2,269	2,671	2,862	2,741	3,585	3,283	7.7
Manufacturing.....	2,565	2,595	2,639	2,628	2,701	2,663	0.7
Nondurable goods.....	699	658	645	712	820	894	5.0
Durable goods.....	1,866	1,937	1,994	1,916	1,881	1,769	-1.1
Transportation and public utilities.....	1,812	2,069	2,274	2,363	^d	2,660	8.0
Wholesale trade.....	1,424	1,436	1,581	1,592	^d (D)	2,037	7.4
Retail trade.....	5,530	6,027	6,394	6,738	7,741	8,281	8.4
Finance, insurance, and real estate.....	947	1,094	1,209	1,344	1,546	1,695	12.4
Services.....	5,657	6,288	6,663	7,230	7,911	8,195	7.7
Government and government enterprises.....	5,021	5,130	5,359	5,492	5,807	6,247	4.5
Federal, civilian.....	900	953	996	1,048	1,081	1,085	3.8
Federal, military.....	205	212	224	243	415	819	31.9
State and local.....	3,916	3,965	4,139	4,201	4,311	4,343	1.2

Source: Bureau of Economic Analysis

^aEstimates based on 1972 SIC.

^bConsists of wage and salary jobs (full- and part-time) plus number of proprietors

^cIncludes number of jobs held by U.S. residents working for international organizations in the U.S. Primary source for private nonfarm employment: ES-202 covered wages—Colorado Division of Employment.

^d(D) Not shown to avoid disclosure of confidential data. Data are included in totals.

^d1976-80, figures not available for 1981.

Income statistics by and large mirror the employment statistics. Retail trade, services, and government are the largest contributors to labor income; but mining, construction, and FIRE showed the greatest growth over the period considered. The single largest component of total personal income, however, is income produced by dividends, interest, and rent, which amounted to over \$150 million in 1981, 18 percent of total personal income. Per capita income in 1981 was estimated at \$9,821, slightly less than the Colorado state average of \$10,033. Available data suggest that the cost of living in the Grand Junction area is slightly less than that of most American cities.

Although agriculture still exerts a strong influence on the character of the resource area, employment and income data emphasize the diminished role of agriculture in the local economy. Farm labor makes up less than 3 percent of the total work force, and farm proprietors' income has become an erratic and declining contributor to area personal income, averaging less than 1 percent of the total over the years 1977 to 1981.

Unemployment in Mesa County has tended to parallel state levels. A sharp upturn in late 1982 was the direct result of the slowdown in energy development activities.

ECONOMIC SECTORS POTENTIALLY AFFECTED BY RESOURCE MANAGEMENT DECISIONS

The size and complexity of Mesa County's economy reflects its role as a supplier of goods, services, and labor to a large part of western Colorado and eastern Utah. Because it relies on activity over such an extensive area, the economy is less sensitive to management changes in the immediately surrounding Grand Junction Resource Area. It is, consequently, unlikely that any of the alternatives considered will have major impact. Those sectors that may be affected by resource management decisions are described here.

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Agriculture

No significant changes are anticipated in the grazing management program; therefore, no resultant effects on the local livestock industry are likely. Even if major changes in the grazing program were to occur, there would be little effect on the local economy since livestock production has ceased to be a major economic factor in the area. In 1980, about 1.5 percent of the county's total employment and less than 1 percent of the county's total income were tied to livestock production. The possibility remains that individual permittees could be significantly affected by resource management changes that would affect their allotments.

Mining

About 11 percent of Mesa County's 1980 employment (4,400 jobs) directly or indirectly relied on mining. The one currently operating coal mine employs about 200 persons and is partially on public land. Sizeable tracts of federal coal have been leased in the resource area during the last several years. At full development, the leases could produce up to 14 million tons per year and employ up to 2,600 people. Development has been slowed, however, by lack of demand.

The major mining employer is the oil and gas industry which directly employed over 1,500 people in 1980. However, the better part of the drilling and production activity serviced by the Mesa County oil and gas industry is outside the Grand Junction Resource Area. While changes in management of gas production activities in the resource area would have local effect, they would be of minor significance relative to the downturn in production brought about by the national recession. In the last two years, layoffs have been substantial, and a number of oil and gas service businesses have closed their Grand Junction offices.

Manufacturing

The only manufacturing activity potentially affected by public resource management is the wood products industry. Mills within or near the Grand Junction Resource Area produce about 10 million board feet of lumber annually. Only small amounts of that currently come from public domain forest lands, and changes in forest management are thus unlikely to have any impact. The greatest potential for impact lies in the amount, quality, and accessibility of fuelwood made available to the public.

Retail Trade and Services/Tourism

Retail trade and services are the biggest economic sectors in Mesa County providing direct employment to over one-third of the county's workforce (over 14,000 jobs). Although most potential effects on these sectors are indirect and unmeasurable, changes in recreation management, particularly for river and wilderness activities, may have localized economic impacts.

PUBLIC REVENUE

Payment in lieu of taxes (PILT) is an annual payment to counties based on population and total entitlement acres of federal lands. The figures in Table 3-18 include payments based on BLM, U.S. Forest Service, and National Park Service lands in Mesa County. PILT is subject to annual Congressional appropriation but is unaffected by local public land management except for sales of public land.

Mineral royalty payments are the county's share of royalty payments made on mineral production from the federal mineral estate (Table 3-18). Federal and Colorado law direct that the county of origin receive 25 percent of the total royalty payment up to \$800,000 annually. A portion of the total royalty payment goes into the State's Local Government Mineral Impact Fund, part of which may also be available on a grant basis to Mesa County (including jurisdictions within the county) to offset the impacts of mineral development. Most of Mesa County's royalty payment is based on gas production in the county (a small amount is based on coal production).

The County Road Department has free use permits for about 1.2 million cubic yards of gravel. In 1983, they used less than 50,000 yards, which accounted for about 40 percent of total use. The sales value of this gravel is about \$20,000. Loss of free use would probably affect the level of road maintenance (often on public land) rather than road department expenditures.

Municipalities and service jurisdictions receive no direct revenue from public land management. Their operation and fiscal status can, however, be directly affected by their use of public land.

Transportation

Table 3-18. Mesa County: PILT and Mineral Royalty Payments

Total County Revenue, 1980-84 (\$1,000)

	1980		1981		1982		1983		1984	
	Payment	Per-cent	Payment	Per-cent	Payment	Per-cent	Payment	Per-cent	Payment	Per-cent
PILT.....	890.8	4.3	839.8	3.5	723.1	2.7	636.1	2.3	690.0	2.8
Mineral Royalty.....	63.7	0.3	76.8	0.3	150.8	0.6	149.6	0.5	150.0	0.6
Total County Revenues from all Sources.....	20,759.7	100	23,534.6	100	26,934.6	100	28,218.9	100	24,914.7	100

TRANSPORTATION

ROADS

Legal access, topography, and road conditions are the major factors limiting access to public land in the resource area. Relatively small parcels of private holdings are increasingly being used to block access to large areas of public land. Some landowners are realizing a financial benefit from charging the public for access to that land.

Landowners are also requesting the county government to vacate certain roads, and most requests are currently being approved. The result is a further reduction in legal public access to public land.

At present, approximately 1,912 miles of road on federal, state, or private land throughout the resource area provides physical or legal access to public land. There are 267 county roads that provide 710 miles of road important to the resource area's transportation system.

Many public land roads are in poor condition due to a combination of factors which include poor soils, adverse weather, and vehicle use during periods of saturation. Roads under BLM control are normally maintained annually. However, because of budget constraints, more frequent maintenance is not feasible. Some of the public land roads will require reconstruction and realignment to accommodate increase in use. These roads are usually passable only during dry weather, and many require four-wheel drive or high clearance vehicles. A few energy-related roads have been properly built and receive good maintenance.

Transportation management is in response to resource area activity needs for access. Key activities include recreation, forestry, wildlife, range, wilderness, wild horses, minerals, and oil and gas. Public access is also needed for hunting, camping, woodcutting, and other recreational activities. Areas identified as needing easement acquisition include Bang's Canyon, Cactus Park, Dominguez Canyon, McDonald Creek, and Prairie Canyon. A Douglas Pass to Roan Creek access route has also received much public interest and would provide a loop road from Grand Junction.

Administrative access for management of range, timber, wildlife, and communication sites is also necessary. At present, such access is needed to Crawford Peak and Timber Ridge on Glade Park, Land's End on Grand Mesa, and through Divide Road between Baxter Pass and Douglas Pass.

Legal public access is good in only the Gateway and Dominguez Canyon areas. Access in the remainder of the resource area is either partial (Glade Park, Baxter Pass, Douglas Pass, Mount Garfield, De Beque) and usually only to the lower elevations, or poor or nonexistent in the higher areas (Collbran and Kannah Creek).

TRAILS

The numerous trails existing on public land are not maintained and most are inaccessible for public use. Trail access (foot or horse) from Grand Junction to the Little Book Cliffs Wild Horse Range via the Book Cliffs and public access to the Dominguez Canyon and Black Ridge Canyons WSAs is necessary for public use.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

Chapter 4 discloses the physical, biological, social, and economic consequences of implementing the alternatives described in Chapter 2. It discusses only the resources that would be impacted. No impacts on geology, topography, and prime and unique farmlands would result from management actions.

A committed mitigation measures section, normally presented in this chapter, have not been included. Measures and procedures that could be taken to avoid or reduce environmental impacts (mitigation) were designed into the proposed management actions.

Unavoidable adverse impacts also were not included in this chapter. Unavoidable adverse impacts are those impacts that remain after mitigation. Because a mitigation section was not included in this chapter, an unavoidable adverse impacts section was not applicable.

The impacts section is divided into two main subdivisions—Impacts from Proposed Management Actions and Cumulative Impacts. In some cases the cumulative impacts are not presented because they are the same as the Impacts from Proposed Management Actions.

ASSUMPTIONS AND GUIDELINES

For the purpose of analyzing the impacts of implementing the four alternatives, the following assumptions were made. Assumptions were not made for all resource programs.

WATER RESOURCE ASSUMPTIONS

1. Water rights necessary for the construction of projects can be acquired.
2. Stipulations protecting watershed values from mineral exploration and development impacts would be included in mineral leases.
3. Any impacts to water transmission lines in the Palisade municipal watershed would quickly be remedied by the responsible coal company.

OIL AND GAS ASSUMPTIONS

1. In order to analyze the impacts on oil and gas development in the Little Book Cliffs and Demaree Canyon WSAs, the following assumptions were made based on projected well densities and the relative acreages of pre- and post-FLPMA leases:

- a. Thirty-one new wells would be developed in the Little Book Cliffs WSA during the next 20 years. The 31 new wells consist of 8 pending (see Appendix E) and 14 projected APDs on pre-FLPMA leases and 9 projected APDs on post-FLPMA leases.

- b. Thirty-three new wells would be developed in Demaree Canyon WSA during the next 20 years. The 33 new wells consist of 26 projected APDs on pre-FLPMA leases and 7 APDs on post-FLPMA leases.

- c. The projected wells on post-FLPMA leases would be approved based on the assumption that they would not impair wilderness suitability or that they would be developed following Congressional release of the Demaree Canyon and Little Book Cliffs WSAs from wilderness review.

- d. Full field development in the two WSAs would take approximately 70 years; thus, the impacts of full field development are beyond the 15- to 20-year scope of this RMP/EIS.

2. Oil and gas related projects would be accomplished in a manner similar to previous activity and would result in the following surface disturbance.

Well sites—330 feet X 330 feet (2.5 acres per site).

Roads—1 mile of 30 foot wide road per each well site (3.6 acres).

Pipelines—1 mile with 22.5 foot width of new disturbance (2.7 acres for each producible well).

Facilities—four new 5-acre sites; twelve new 3-acre sites; and two new 5-acre disposal pits.

3. For well sites, roads, and pipelines, 50 percent of the disturbed area of producible wells would be reclaimed within 5 years; 50 percent would remain as road surface, production areas, and

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unsuccessfully reclaimed areas. Abandoned wells would be totally reclaimed within 5 years.

4. Considering reclaimed areas and new disturbance, the average number of acres in a disturbed condition in an average year, due to all oil and gas related activities, would be 2,538 acres. Demaree Canyon WSA would have 83 acres and the Little Book Cliffs WSA would have 78 acres in a disturbed condition in an average year.
5. A total of 7,705 acres would be disturbed during the 20 year period of this plan. Demaree Canyon WSA would have a total of 249 acres and Little Book Cliffs WSA would have a total of 235 acres disturbed.

WILDLIFE ASSUMPTIONS

1. All the deer and elk are on the winter range in the winter and 90 percent of the deer and all the elk are on summer range in summer. Except where year-long (resident) and spring-fall ranges are discussed, all big game ranges are either summer or winter range.
2. All big game severe winter range except that in Game Management Unit 30 and all big game winter concentration areas as determined by Colorado Division of Wildlife as of December 1984 are considered critical winter range.
3. Loss of any critical winter range would cause a proportionate reduction in big game populations.
4. Colorado Division of Wildlife computerized population modeling program and base input data are correct.
5. Public land would hold an increasing percentage of the big game forage relative to private land. At the end of 20 years, it would have gone from 62 percent to 69 percent.
6. The snag management goal of retaining an average of three to seven of the largest standing nonhazardous dead trees per acre is a minimum standard.
7. The impacts addressed herein account for the overall and cumulative effects; specific impacts would be adequately reviewed in activity plans and project environmental assessments.

CONTINUATION OF CURRENT MANAGEMENT IMPACTS

IMPACTS ON AIR QUALITY

Impacts from Air Quality Management

Short-term localized impacts to air quality would result from mechanical and burning vegetation manipulation practices. These impacts would be small in scale and dispersed throughout the resource area. These factors combined with required management stipulation for vegetation manipulations would reduce the significance of the impacts.

Increasing off-road vehicle use in open areas would continue to accelerate soil erosion and increase fugitive dust emissions. Dust suppression control devices would not be practical.

Increased levels of air pollution are anticipated from regional growth and energy minerals development. Emissions from primary sources would be minimized through applicable policies, regulations, and statutes.

IMPACTS ON SOILS

Impacts from Proposed Management Actions

Surface disturbance associated with oil and gas development, mineral development, forestry development, and development and projects associated with other activity implementation treatments would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. Sediment and erosion control measures on 117,000 acres would help to reduce sediment yield from those areas and improve downstream water quality.

No surface occupancy and development on 18,000 acres in the Baxter/Douglas Pass area, identified as having an extremely high slump hazard would help to avoid property loss and potential increases in soil erosion, sediment yield, and loss of vegetation. Soil slump is presently occurring here and on 860 acres in the Plateau Creek area. Surface disturbance in these areas would greatly increase the extent and severity of soil and property loss.

Continuation of Current Management Impacts

In the intensive recreation management areas and areas open to off-road vehicles, increasingly heavy recreation and off-road vehicle use would continue to accelerate soil erosion and sediment yield and loss of vegetative cover. Reclamation of these areas would be difficult.

Development of ten pending APDs in the Little Book Cliffs area would increase soil erosion and sediment yield until well sites and access roads were reclaimed. Development of 23 projected wells in the Little Book Cliffs WSA would further increase soil erosion and sediment yield. Development of 33 new wells in the Demaree Canyon WSA would also increase short-term soil erosion until successful reclamation took place. In addition, a number of well sites could potentially be located on soils having an extremely high probability of slumping when cuts are made in the sideslopes. Loss of the well pad site and access road could occur, along with extensive slumping and soil erosion in the adjacent area. The No Surface Occupancy stipulations would reduce or eliminate these impacts on the post-FLPMA leases.

IMPACTS ON WATER RESOURCES

Impacts from Proposed Management Actions

Impacts from Water Resources Management. Maintaining the check and retention dams in Indian Wash and Leach Creek (spread over approximately 6,000 acres) would provide water quality and flood control benefits. An estimated 15,000 to 20,000 tons of sediment and 800 to 1,000 tons of salt would be prevented from entering the Colorado River annually which would improve water quality. Flood control benefits to Grand Junction would continue.

Building additional sediment control structures in Leach Creek (spread over approximately 600 acres) would prevent another 1,200 to 3,000 tons of sediment and 100 to 125 tons of salt from entering the Colorado River. Additional minor flood control benefits would be provided to Grand Junction.

Permitting only limited surface disturbance in the Palisade municipal watershed would help to protect that town's drinking water supplies. Similarly, the No Surface Occupancy stipulation on oil and gas development on the BLM portion of the Grand Junction municipal watershed would help protect Grand Junction's water supplies.

Management of Badger Wash as a hydrologic study area (685 acres) would enable the BLM to control oil and gas development in Badger Wash. This would provide the BLM an opportunity to study

the impacts of this development on sediment and salinity yield on the Mancos Shale.

Restricting development within wetlands and 100-year flood plains would help protect important wildlife habitat and afford continued flood protection benefits to downstream communities.

Impacts from Locatable Minerals Management. Leaving 1.2 million acres of the resource area open to locatables could potentially degrade water quality in parts of the resource area. The major impacts would result from increased sediment introduced to streams from construction of associated mine roads or from placer mining operations. Heavy metal contamination from spoil piles could also occur. Impacts can not be quantified without site-specific information. The Gateway area presently experiences water quality degradation from past and present uranium mining activities.

Impacts from Coal Management. Identifying 325,968 acres as acceptable for further coal leasing consideration could impact water resources. Mining activities would increase sediment and possibly salinity yield to streams especially from construction of associated mine roads and surface facilities. Potential water quality degradation may result from spoil pile runoff. Underground mining could disrupt ground water systems causing changes in quantity and quality of ground water. Mitigation would be imposed to minimize most of these impacts.

Designating 38,521 acres (14,100 acres based on coal unsuitability review and 24,421 based on multiple use tradeoff decisions) as unsuitable for further coal leasing consideration would prevent water quality and flow impacts associated with mining activities from occurring. Subsurface mining in the Colorado River corridor and Palisade municipal watershed could create significant subsidence with surface expression. This could result in loss of some or all of the perennial stream flow in the municipal watershed and in the Colorado River by leakage to the mining zone. The Palisade municipal water supply could thereby be lost or reduced. Designating these areas unsuitable would prevent these impacts from occurring.

Development of existing pre-FLPMA coal leases in the lower portion of the Palisade municipal watershed (identified as unsuitable) would not have a significant effect on Palisade's water supplies. The leases within the watershed have either been mined or are presently being mined. This portion of the watershed is mainly used for water transmission facilities. Cabin Reservoir also partly overlies one of the leases. By not mining directly under the streams or reservoirs, or by prohibiting coal mining within established buffer zones along streams and

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reservoirs, impacts to the watershed would be lessened. Any site-specific impacts of developing this lease would be addressed when a mine plan was submitted.

Impacts from Oil and Gas Management. Oil and gas activities require construction of roads, pads, and pipelines. This surface disturbance causes increased sedimentation and, possibly, salinity entering streams. These water quality impacts decrease to near preconstruction levels after proper rehabilitation. Pads, roads, and pipelines that are not properly rehabilitated or maintained would remain as significant sediment sources.

Placing 608,383 acres in a standard lease terms category and 256,399 acres in an unassigned category would leave those lands open to water quality impacts from oil and gas development. The site-specific impacts would be determined when the applications for permit to drill are received.

Placing 111,838 acres in a no leasing category would prevent water quality degradation associated with oil and gas development on those lands. None of these lands would be closed to leasing because of sensitive watershed values.

Placing 1,545 acres in the Indian Wash dam area, Badger Wash hydrologic study area, and Grand Junction watershed in a no surface occupancy category for watershed protection would eliminate onsite adverse water quality impacts from oil and gas drilling. Water quality impacts that would be avoided by the no surface occupancy stipulation include heavy metal and total dissolved solids contamination from leakage from reserve pits, and sedimentation increases associated with site (pad) preparation. Potential water quality impacts (e.g., sedimentation) could occur from road and pipeline construction, however.

Placing 439,332 acres in an Other Stipulations oil and gas leasing category would minimize water quality degradation associated with oil and gas development. Specific impacts would be determined when the applications for permit to drill are received.

Allowing development of ten pending applications for permit to drill in the Little Book Cliffs area would degrade water quality by increased sedimentation from pad, road, and pipeline construction. The sediment loads would decrease to near predevelopment levels following successful rehabilitation, a period of one to two years.

Development of the ten pending APDs in the Little Book Cliffs area and the projected 23 APDs in the Little Book Cliffs Wilderness Study Area would disturb an estimated 235 acres for road, drill pad, and pipeline construction. This surface disturbance would cause increased sedimentation degrading

water quality if it occurred adjacent to surface waters. Further water quality impacts could occur from reserve pit leakage causing increased levels of total dissolved solids and heavy metals in receiving waters. Potential sediment impacts occurring from approximately 120 acres would decrease to near predevelopment levels following successful rehabilitation. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Developing 33 projected new wells in Demaree Canyon Wilderness Study Area would disturb approximately 250 acres for road, drill pad, and pipeline construction. These construction activities would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Additional water quality impacts could occur from reserve pit leakage causing elevated total dissolved solid and heavy metal levels in receiving waters. Potential sediment impacts occurring from approximately 125 acres would decrease to predevelopment levels as the area was rehabilitated. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Impacts from Mineral Materials Management. Mining of mineral materials has the potential for localized short-term water quality degradation, mostly from increased sediment. However, proper mitigation could keep the problems minor.

Impacts from Forest Management. Activities associated with managing 109,050 acres of pinyon-juniper would increase sediment. Most sediment would be produced from road construction, road use, and skidding of trees. The highest sediment yields would be in those areas near streams with highly erosive soils.

Impacts from Wildlife Management. Varying wildlife management would have both beneficial and adverse water quality impacts. Proposed vegetation manipulations would have a localized, one to two year impact on water resources, mostly an increase in sediment. The protection of fisheries and riparian habitat would help to protect water resources by limiting surface disturbance and filtering sediment produced from adjacent upland areas.

Impacts from Recreation Resource Management. Management of the Grand Valley for intensive recreation use would significantly increase sediment and salinity yield off of these fragile soils. The major impact comes from off-road vehicle use. Sediment and salinity yield from this area are already high, and more intensive use would aggravate the problem.

Continuation of Current Management Impacts

Management of wildland areas would help reduce potential surface disturbance and, thus, keep water quality at existing levels.

Impacts from Off-Road Vehicle Management. Continuing to open 1,058,472 acres to off-road vehicle use would allow continued increases in sediment and salinity yield because of the increased surface disturbance (destruction of vegetation, soil compaction, and disturbance of the soil surface by tires) caused by off-road vehicles. The effects are greatest, and most evident, in those areas of saline soils receiving heavy use, such as the Grand Valley Desert and Cactus Park. Site-specific information would be needed to quantify the effects of off-road vehicles, however.

Closing 17,902 acres to off-road vehicle use would stop the off-road vehicle impacts to water resources in those areas where off-road vehicle use has been a problem in the past. The effects would gradually taper off to pre-ORV levels as vegetation and soils recovered to natural levels.

Limiting ORV use in the rest of the resource area (seasonal closures, existing roads and trails) would help to keep sediment yields at present levels. In the case of limited to designated roads, the limitation may cause sediment yield to decline as the nondesignated roads are revegetated. The effect of these limitations would be greatest where ORV use is heavy, such as Cactus Park.

Impacts from Transportation Management. Acquiring trail access to North Creek and public access to the Crawford Peak, Middle North Dry Fork, and Timber Ridge area would increase sediment yield to streams by an unknown amount. The presence of roads in an area will increase sediment yield because of sediment produced off the road's surface and by increased erosion resulting from the road's concentrating of runoff. Proper design and maintenance can minimize increased yields. Increased use of existing roads can slightly increase existing sediment yield by increased disturbance of the road surface.

Impacts from Public Utilities Management. Prohibiting placement of public utilities in unsuitable areas will prevent water quality problems from occurring in those areas. This would be most significant to water resources in the Baxter-Douglas slide areas, Badger Wash, and Skipper's Island.

Designation of areas as sensitive to public utilities would enable the BLM to better control and mitigate any potential water resources impacts resulting from utility placement. This would be of most significance to water resources in the Grand Junction and Palisade municipal watersheds.

Designating the remainder of the resource area open to public utilities would have the potential of

slightly increasing sediment and salinity yield. These effects would be impossible to quantify without site-specific project information. Any water resources impacts would be addressed for a specific project before a right-of-way grant was issued. Most of the water resources impacts resulting from public utilities could be minimized by proper utility design and location.

Impacts from Fire Management. The effects of fire management on water resources are very difficult to predict or quantify on a resource area-wide basis because of the tradeoffs involved between positive and negative, long-term and short-term effects of fire. Site-specific information would be necessary to predict and quantify exact effects.

Fires, whether natural or man-caused, destroy much of the vegetative cover. This, in turn, causes short-term water quality problems because of increases in nutrients and sediment entering the streams. As the vegetation reestablishes, these increased sediments and nutrients decline to, or below, preburn levels. Suppression of fires helps keep down the short-term increases in sediment and nutrients, but may not allow the long-term decreases in sediment yield related to increased vegetative cover often resulting after fires.

This relationship may not be true for areas with steep slopes, poor vegetative productivity, or poor or highly-erosive soils. These areas are often very slow to recover and, thus, fires should be suppressed quickly. Site-specific information would be necessary to predict and quantify exact effects.

Suppression activities would also contribute to short-term water quality problems. Surface disturbance caused by construction of fire access roads, fire lines, fire breaks, etc., would compound the sediment yield increases caused by the fire. Also, any fire retardant used could eventually be washed into streams, causing a short-term decline in water quality.

Cumulative Impacts on Water Resources

As a whole, the resource area would experience a slight increase in sediment and salinity yield over existing levels. This increase in sediment and salinity would primarily result from increases in roads due to increased oil and gas activity, forestry activity, and off-road vehicle use. Due to the localized nature of these activities, certain areas would receive larger increases than others.

Maintenance and installation of new sediment control structures in Indian Wash and Leach Creek would help offset this increased sediment and salinity yield by stopping 16,000 to 23,000 tons of

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sediment and 900 to 1,100 tons of salt annually from reaching the Colorado River.

Restrictions placed on surface-disturbing activities in flood plains, wetlands, threatened and endangered species areas, etc., would help to prevent much potential water quality degradation.

IMPACTS ON LOCATABLE MINERALS

Impacts from Proposed Management Actions

Impacts from Locatable Minerals Management. Identifying 1,266,548 acres as open to location would make this acreage available for exploration and development of locatable minerals under the general mining laws. Continuing current withdrawals on 124,843 acres and withdrawing an additional 68,000 acres in the Black Ridge area would eliminate a total of 192,843 acres from location. Geologic information indicates that the Black Ridge area has a low economic development potential.

IMPACTS ON COAL

Impacts from Proposed Management Actions

Impacts from Coal Management. Identifying 325,968 acres of public minerals as acceptable for further coal leasing consideration would make an estimated 3,839 million short tons of in-place (measured, indicated and inferred) coal available for leasing. The resource estimates are based on information adapted from Schwachow (1978) and Hornbaker, et al (1976).

Impacts from Coal Unsuitability Recommendations. Identifying 14,100 acres of federal coal as unsuitable for further coal leasing would eliminate an estimated 185.5 million short tons of in place coal resources from leasing. The impact of eliminating both the Colorado River corridor (4,100 acres) and the Palisade municipal watershed (10,000 acres) from further leasing would be low, as coal companies would have difficulty removing the coal beneath the Colorado River. One coal company with leases on portions of the Palisade municipal watershed has expressed an interest in additional leasing. The leases in this area have an estimated 20 years of reserves based on present production levels from the company producing in the area.

Allowing coal surface facilities in the Colorado River corridor would make it possible for adjacent coal lands to be developed.

Impacts from Multiple Use Tradeoff Recommendations. Identifying the Little Book Cliffs Wild Horse Range (24,421 acres) as unacceptable for further coal leasing consideration would eliminate an estimated 321.4 million short tons of coal in place from further leasing consideration. This would be a moderate impact because lease holders of existing leases would be unable to expand their operation and coal companies have expressed interest in leasing this area.

Impacts from Oil and Gas Management. Leasing and subsequent development of oil and gas in the same areas identified as acceptable for further coal leasing consideration (325,968 acres) could reduce considerably the amount of coal available for mining. The amount of coal unavailable for mining would depend on various unknown factors such as the scope and timing of development of both resources and the amount of coal required to be left as pillars around existing oil and gas wells. No projections on coal loss around oil and gas wells have been made for coal leasing areas. However, a conflict could exist between coal and oil and gas if sufficient amounts of coal were required to be left in place so as to make the area uneconomical to mine. Any conflict will be resolved prior to coal leasing.

Developing ten pending applications for permit to drill (APDs) and 23 projected APDs in the Little Book Cliffs area would result in the following impacts: One of the pending APDs would have no impact on coal development because it is located outside the area found acceptable for further coal leasing consideration under this alternative. Nine of the pending APDs are located inside the area found acceptable for further coal leasing consideration. These nine APDs and the 23 projected APDs would conflict with future coal leasing and development because a pillar of coal would have to be left around each producing well during simultaneous development of coal and oil and gas. The amount of coal left around each well would vary considerably depending upon the method of calculation. The Bureau of Mines requires a 150-foot-radius (300-foot-square pillar) of coal left around each producing well. For each producing well this would result in an average coal loss of 29,000 tons of in-place coal, or 261,000 tons of in-place coal for the nine pending APDs and 667,000 tons for the 23 projected wells for a total loss of 928,000 tons of in-place coal. This loss would be minor. The Colorado Mined Land Reclamation Board might require using a 21 degree angle of draw from the coal bed to the surface. Using this method, each producing well would result in an average loss of in-place coal of 480,000 tons per well, or 4,320,000 tons for the nine pending APDs and 11,040,000 tons for the 23 projected wells for a total loss of in-place coal of

Continuation of Current Management Impacts

15,360,000 tons. This would be a high impact and might result in the area being uneconomical to mine.

Developing 33 projected wells in the Demaree Canyon WSA would result in the following impacts: Leaving coal around producing wells as required by the Bureau of Mines could result in the loss of 57,000 tons of in-place coal. Using the possible requirements of the Colorado Mined Land Reclamation Board, the resultant loss could be 15,840,000 tons of in-place coal. The Colorado Mined Land Reclamation Board method would result in a high impact that might result in the area being uneconomical to mine.

Cumulative Impacts on Coal

Identifying 14,100 acres as unsuitable based on coal unsuitability criteria and 24,421 acres as unacceptable based on multiple use tradeoffs would eliminate a total of 38,521 acres from further coal leasing consideration. The tonnage lost would be an estimated 506.9 million short tons. This would

be a low impact for the 14,100 acres and a moderate impact in the Little Book Cliffs Wild Horse Range considering the amount of interest shown in these areas.

IMPACTS ON OIL AND GAS

Note: The impacts of assigning public oil and gas mineral estates to leasing categories could vary significantly depending upon which categories were assigned to which lands. For example, placing high development potential lands in a no leasing category would have a much greater impact than placing those same lands in a no surface occupancy category.

Impacts from Proposed Management Actions

Impacts from Oil and Gas Development. Table 4-1 lists the development potential within each leasing category.

Table 4-1. Development Potential by Leasing Categories

Lease Category	Oil and Gas Development Potential (Acres)			
	High	Moderate	Low	Total
No Leasing	30,121	11,355	70,362	111,838
Leasing with Stipulations:				
No Surface Occupancy	21,135	13,737	8,567	43,439
Other Stipulations	371,146	33,230	34,956	439,332
Undesignated	125,812	45,204	85,383	256,399
Standard Lease Terms				608,383

Note: Table 2-6, Chapter 2, identifies oil and gas leasing restrictions by resource concerns and by alternative.

Making approximately 608,383 acres available for lease with only standard lease terms would allow exploration and development with few restrictions.

Closure of approximately 30,121 acres with high development potential to leasing would result in lost rental and royalty revenues and foregoing of the potential reserves. Closure of about 11,355 acres with moderate development potential would result in lost rental revenues and foregoing of resources; however, it is much less likely that development activities would occur on these lands than on high potential lands. Closure of approximately 70,362 acres with low development potential could result in loss of rental income; however, it is unlikely that these lands would be applied for or that any development would occur as the areas are not considered to be prospectively valuable for oil and gas.

Making approximately 21,135 acres with high development potential and 13,737 acres with moderate development potential available for lease with the no surface occupancy (NSO) stipulation would result in higher drilling and development costs, as directional drilling would be necessary. Higher drilling and development costs might result in limited activity and foregoing of some oil and gas reserves. Making approximately 8,567 acres with low development potential available for lease with the NSO stipulation would have little effect as it is unlikely that any development would occur on these lands.

Making approximately 371,146 acres of high and 33,230 acres of moderate development potential lands available for leasing with other stipulations could result in some higher costs and scheduling inconvenience for development projects but prob-

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ably would not result in foregoing oil and gas reserves. Making approximately 34,956 acres with low development potential available for lease with other stipulations would probably not affect development as it is unlikely that such projects would occur.

Leaving approximately 256,399 acres unassigned to a lease category could result in impacts similar to those described in the preceding discussion. The specific impacts would not be known until assignment of a leasing category.

Impacts from Coal Management. Mining of coal might result in delays in drilling schedules, higher drilling and development costs, and the use of special techniques or alternate drilling sites. Mining might also damage existing wells. If the potential gas producing zone were a minable coal bed, mining might remove or reduce the gas resource.

IMPACTS ON MINERAL MATERIALS

Impacts from Proposed Management Actions

Impacts from Mineral Materials Management. Identifying 1,355,565 acres as open would make that acreage available for mineral material sale and free use permits. This would allow companies and individuals to submit applications for removal of mineral materials on 93 percent of the resource area.

Continuing to close 6,188 acres and closing an additional 97,683 acres would eliminate a total of 103,826 acres from consideration. This would not be a significant impact within the entire resource area, although the impacts could be high in isolated site-specific areas.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Paleontological Resource Management. Surveys on 433,760 acres in Class I areas would significantly decrease the possibility of fossil destruction by surface-disturbing activities because these areas have a very high probability of fossil occurrence. Protection of fossils discovered through such activities would preserve them for use in interpreting the fossil record.

Surveys would not be required in Class II and Class III areas, increasing the potential for destruc-

tion of fossils. These areas, however, have a much lower probability for fossil occurrence.

Implementation of the Rabbit Valley Paleontological Management Plan would provide additional information for interpreting the fossil record and greater opportunity for public education.

Impacts from Oil and Gas, Mineral Materials, and Public Utilities Management. Designating the Rabbit Valley paleontological site as sensitive to oil and gas activities and no surface occupancy on the Fruita Paleontological Site would aid in decreasing the chances of fossil destruction, as would elimination of public utilities from both areas. Closing these sites to mineral material removal would also provide a high degree of protection to fossil resources.

Impacts from Off-Road Vehicle Management. Leaving Rabbit Valley open to off-road vehicle use would increase the chances for fossil destruction and reduce the effectiveness of a paleontological management plan. The Fruita Paleontological Site would remain closed to off-road vehicle use, providing a high degree of protection to fossils at that site.

Cumulative Impacts on Paleontological Resources

Surveys in Class I areas and implementation of the Rabbit Valley paleontological management plan would significantly reduce the incidence of fossil destruction, as would elimination of public utilities and mineral material removal from the area. However, leaving the area open to off-road vehicle use would increase the probability of destruction of fossils on or near the surface and would limit the effectiveness of management actions.

IMPACTS ON FORESTRY

IMPACTS FROM PROPOSED MANAGEMENT ACTIONS

Impacts from Forest Management. Management practice on 109,050 acres of productive pinyon-juniper woodlands would result in a potential annual fuelwood harvest of 2,600 cords. Sawtimber on 39,105 acres of commercial forest land would be cut only after completion of a timber production capability classification. Most of the sawtimber acreage is in small, isolated stands on steep ground and is uneconomical to manage now and in the foreseeable future.

Silvicultural practices that include clearcutting, shelterwood and selective cutting, and commercial

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thinning would help to maintain the health and increase productivity of the forest resource. Overmature stands would be harvested and allowed to naturally reforest with younger, more vigorous trees.

Impacts from Locatable Minerals and Oil and Gas Management. Locatable minerals development could significantly impact the forest resource in areas where they overlap. Uranium mining could reduce the amount of pinyon-juniper under management by as much as 25 percent in some areas. Much of this loss would begin to be recovered in 25 to 35 years. Oil and gas development could provide better access into many areas on the Book Cliffs.

Oil and gas activity could cause the annual loss of 70 acres of forest land. This land would be out of production for up to 60 years for a producing well and 30 years for a dry hole. The ten pending APDs in the Little Book Cliffs area, as well as the 23 projected gas wells in the Little Book Cliffs WSA and the 33 projected gas wells in Demaree Canyon WSA, are included in this calculation. This would not be a significant impact.

Impacts from Wildlife Management. Implementation of the Roan Creek Habitat Management Plan would cause the temporary loss of 380 acres of productive pinyon-juniper woodland from management and harvest. This would be an insignificant impact.

Impacts from Livestock Grazing. Maintenance of the existing chainings (done in the 1960s) would result in the permanent loss of approximately 9,000 acres of productive pinyon-juniper woodland, with a large percentage of this area having some of the highest production potential in the resource area.

Impacts from Wild Horse Management. Limiting sales in the Little Book Cliffs Wild Horse Range to commercial sales of no more than 30 acres would have no significant impact on meeting public demand at the present time. When fuelwood demand exceeds the supply capability of areas outside the wild horse area, however, this restriction could have a significant impact.

Impacts from Recreation Management. Designation of the Black Ridge area as recreation land would reduce the woodland base by approximately 10,087 acres. Designating Big and Little Dominguez Canyons, Sewemup Mesa, and The Palisade as wildland areas would further reduce the base by 11,375 acres in the Grand Junction Resource Area and by 2,915 acres in the Uncompahgre Resource Area (Montrose District). This action would also reduce the commercial forest land base by about 434 acres. The cumulative impacts of these actions would be significant.

Impacts from Transportation Management.

The Town of Palisade's exclusive easements for use of the Rapid and Cottonwood Creek roads in the Palisade municipal watershed would close the use of these roads for the removal of timber from 402 acres of commercial forest land and from 805 acres of productive pinyon-juniper woodland.

Cumulative Impacts on Forestry

Intensive management of 109,050 acres of productive pinyon-juniper woodlands would improve the health and vigor of stands and increase productivity. The annual harvest would increase on these lands over the long term as a result of intensive management. Multiple use restrictions would prohibit any type of intensive management on approximately 25,634 acres of productive pinyon-juniper woodlands, 20 percent of the woodland base.

IMPACTS ON WILDLIFE

Impacts from Proposed Management Actions

Impacts from Wildlife and Fish Habitat Management. Managing wildlife habitat to allow deer and elk use of the public land to increase by up to 24 percent would meet Colorado Division of Wildlife population goals for 1988 to 1990. Most of the increase would occur in the Dominguez and Gateway areas of the Uncompahgre Plateau and in the area north of the Book Cliffs. Sixty-five (65) percent of the resource area would have deer and elk as key management species. Site-specific impacts from increasing forage production by the various methods listed in Appendix B would be analyzed in the habitat management plans.

Habitat management to maintain forage for bighorn sheep would allow each of the two reintroduced herds to reach a population of 100 animals by 1990. Habitat treatments would increase populations of sharp-tailed and sage grouse on Glade Park and protection of habitat for the wild turkey on the Dominguez and Calamity Mesa areas would assist the Colorado Division of Wildlife in fostering levels that would allow hunting of these game birds.

Stream improvement projects (where needed) along 71 miles of streams would help to maintain or improve fish habitat. Since the fish potential on public land streams is not large compared to the potential on streams of forest and private land, this impact would be modest. Stipulations protecting riparian vegetation on all perennial streams would reduce loss of this habitat and increase the amount

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in fair and good condition to 75 percent of the total (approximately 2,500 acres).

Impacts from Threatened and Endangered Species Management. Limiting surface-disturbing activities to protect wintering bald eagles along the Colorado River below Fruita. This would also decrease harassment and poaching of the resident deer population during winter months and would help to maintain the herd, which represents two percent of the total population in the resource area.

Maintaining the larger prairie dog colonies for benefit of the potential existence of black-footed ferrets would not only provide more food for raptors on the sensitive list but also for furbearers such as coyotes, badgers, and weasels. This would help to stabilize or even increase their populations.

Impacts from Water Quality Management. Protection of the Palisade municipal watershed would limit disturbance of about 600 deer on 2,000 acres of critical winter range. Construction of retention dams on Leach Creek would provide up to 200 additional acres of important waterfowl resting areas (spring and fall), expanding the area with public access which would be a significant impact. Stream habitat improvement projects along Big and Little Dominguez Creeks would increase fish productivity by 30 pounds per acre.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Exploration and development of locatable minerals and mineral materials during the next 20 years could disturb about 380 acres of riparian habitat, grouse strutting ground, and elk calving sites. These occurrences could destroy the affected wildlife populations.

Migratory and resident species of high interest could be adversely affected by coal development. These impacts would be analyzed in a regional coal environmental impact statement prior to leasing.

No significant impact on deer and elk herds would occur in the coal lease areas from the direct effects of mining. However, stress on these animals would increase as a result of increased human activity. If all leasable areas were to be leased and coal mining were to become a major industry, the resource area gains in big game numbers in the next 20 years would likely be lost in the subsequent 20 years.

Oil and gas activity would create additional access that would allow more opportunity for poaching and harassment of deer and elk and would have the greatest adverse impact on these big game animals. Approximately 8,500 AUMs of forage would be lost to deer and elk but would be made up for through habitat management in other areas. This would not prohibit the Colorado Division

of Wildlife from meeting its deer and elk population goals.

Seasonal stipulations on oil and gas activity in critical deer, elk, and bighorn sheep winter range would reduce but not eliminate stress on these animals. The adverse impacts from recreational and off-road vehicle activity would also be reduced. Limiting surface disturbance within 100 feet of perennial streams would do more to protect riparian vegetation and stream habitat for fish than any other single measure.

Development of ten pending APDs in the Little Book Cliffs area would cause the removal of 78 acres of forage usable by wildlife (85 AUMs) and increase wildlife harassment (mainly wintering deer) through increasing public vehicular access by 10 miles of road over the next 20 years. The drilling of 23 projected gas wells in the Little Book Cliffs WSA would cause the loss from forage production of 176 acres (195 AUMs) and increase wildlife harassment through the addition of 23 miles of road over the next 20 years.

The drilling of 33 projected gas wells in the De-maree Canyon WSA would result in a reduction of forage producing area by 249 acres (280 AUMs) and increase harassment of wildlife along 33 miles of road over the next 20 years.

Impacts from Forest Management. Managing the timber and woodland resources to consider wildlife needs would help to improve habitat and forage production for most wildlife species. The significance of this impact would be moderate within the next 20 years but would accumulate to a major beneficial impact over a generation.

Impacts from Wild Horse Management. Limiting herd size to a maximum of 120 horses would allow about 10 percent of the critical deer winter range in the resource area to continue to improve as wildlife habitat.

Impacts from Recreation and Off-Road Vehicle Management. Encouraging concentrated recreation in two intensive recreation management areas would help to reduce wildlife disturbing activities in surrounding areas. Harassment by off-road vehicle use would continue to create the most severe disturbance to wildlife.

Impacts from Land Tenure Adjustments. Emphasizing land trades rather than sales would help to maintain public wildlife habitat and strengthen its manageability by consolidating public ownership. It is not likely, however, that the volume of trades would be great enough to constitute a major improvement.

Impacts from Transportation and Public Utilities Management. Maintaining 22 miles of public

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access roads between Big and Little Dominguez Creeks and acquiring 11.5 miles of access road into the Horse Mountain and Cow Mountain areas and .25 mile into North Creek would open a large block of public land to hunters and would improve game management control by the Colorado Division of Wildlife.

Restrictions on public utilities in riparian areas would protect significant portions of riparian vegetation from destruction and could prevent over 15 collisions of migrating birds with each mile of power line per year. The effect upon the populations of birds would probably be minor. It would be a more humane and aesthetic consideration.

Cumulative Impacts on Wildlife Resources

The Colorado Division of Wildlife goals for deer and elk for 1990 would be met. This would be due in part to the habitat improvements that would be designed through habitat management plans. The improvements not only increase forage production, but would help to increase the use of underutilized areas. Stipulations on potentially disturbing activities to protect big game on critical ranges would help to allow deer and elk populations to approach the potential. Sixty-five percent of the resource area would have deer and elk as key species for wildlife management, and a larger area would receive attention to deer and elk habitat needs. This alternative would maintain the single most effective measure to keep riparian habitat with the wildlife and watershed recommendation of no surface disturbance within 100 feet of perennial streams.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Impacts from Proposed Management Actions

Impacts from Threatened and Endangered Species Management. Applying stipulations to all known locations and areas (sites) with a very high potential for existence of threatened and endangered species would guard against adverse impacts to threatened and endangered species, their habitat, or their ability to maintain or increase in population. Chapter 3 lists the threatened and endangered species in this resource area. Chapter 3 also provides information on the status of these species, thus indicating the significance of actions that might affect the species.

Improving 4.3 miles of Colorado River cutthroat trout habitat would help to maintain the population of this fish. Preparing three habitat management

plans (HMPs) with sensitive, threatened and endangered species as key for management would provide improved habitat and potential for species re-introduction and would chart a monitoring schedule. Key management species would include the peregrine falcon, bald eagle, Colorado River squawfish, razorback sucker, and the Great Basin silver-spot butterfly (which is a nominee to the federal listed threatened and endangered species).

Continuing to cooperate with the Colorado Division of Wildlife in the peregrine falcon recovery project would increase the chances of establishing a self-sustaining population.

Impacts from Water Resources Management.

Limiting surface disturbance in the Palisade municipal watershed would help maintain riparian habitat for the Lewis' woodpecker, yellow-billed cuckoo, and prey species for peregrine falcons.

Watershed projects on Leach Creek, Hunter, Big Salt, and East Salt Washes would improve the habitat for prey species of sensitive raptors nesting along the Book Cliffs. Continuing management of the Badger Wash paired watersheds would maintain 170 acres of habitat for *Cryptantha elata* (sensitive) and the unique Gardner's saltbush/salina wildrye plant community.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management.

Maintaining existing withdrawals (primarily placer) on 36,300 acres along rivers or streams would help protect this important habitat for bald eagles. Closing 3,120 acres in the Badger Wash hydrologic study area to mineral entry would help protect *Cryptantha elata* and the Gardner's saltbush/salina wildrye plant community. Removing two sites from mineral sales would protect habitat for the sensitive Great Basin silverspot butterfly, the plant *Phacelia submutica*, and the threatened Uinta Basin hookless cactus.

Coal unsuitability criteria would not protect sensitive plant species, in particular the musine milk-vetch.

Applying no surface occupancy, no surface disturbance, and seasonal stipulations to oil and gas development including one application for permit to drill (APD) in the Little Book Cliffs Wild Horse Range and nine APDs in the Little Book Cliffs Wilderness Study Area would help protect threatened and endangered species.

Impacts from Forest Management. Prohibiting wood harvest in wooded riparian areas would help to maintain habitat for bald eagles and other sensitive species. Identifying 39,105 acres of conifers and aspen as unsuitable for management pending completion of timber production capability classifi-

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cation would help maintain habitat for raptors, notably the flammulated owl, a migratory species of high federal interest.

Impacts from Wildlife Management. Increasing forage production to help increase big game and waterfowl populations would increase the carrion food base for bald eagles, providing support for an additional 10 birds. Protecting riparian habitat would help maintain important habitat for bald eagles and for sensitive species, including the great blue heron, black-crowned night heron, yellow-billed cuckoo, and the Lewis' woodpecker. Maintaining ponderosa pine seed trees and snags for wild turkey would also provide habitat for the Lewis' woodpecker.

Impacts from Recreation Resource Management. Managing two intensive recreation management areas would help to reduce the impact on threatened and endangered plants by centralizing the more intensive recreation uses. However, the Grand Valley Intensive Recreation Management Area could adversely affect habitat for the sensitive plant *Cryptantha elata* and sensitive animals such as the kit fox, Scott's oriole, and the leopard lizard.

Impacts from Off-Road Vehicle (ORV) Management. Closing to off-road vehicle travel 40 percent of the area having the best peregrine falcon sites and closing portions of the areas with the most viable populations of spineless hedgehog cactus and *Cryptantha elata* would help to protect habitat for these species.

Impacts from Visual Resource Management (VRM). Managing for VRM Class II areas would help to protect habitat for sensitive, threatened, and endangered species.

Impacts from Special Areas Management. Maintaining the Unawep Seep as a research natural area would protect habitat for one of three Colorado colonies of a sensitive species of butterfly. Designating 215 acres around Pyramid Rock as a research natural area would protect sensitive and threatened plant species in that area.

Impacts from Public Utilities Management. Designating Ruby Canyon and the Gunnison and Dolores Rivers as sensitive to public utilities development would reduce river crossings of power lines and thus decrease the potential for bald eagle mortalities caused by collisions with the power lines. Designating 100 feet on each side of perennial streams as sensitive would protect almost all riparian habitat, including that of the threatened cut-throat trout.

Cumulative Impacts on Threatened and Endangered Species

These species would be beneficially affected by the management actions that would continue under this alternative. Any adverse effects due to human use of the public land in the next 20 years would not be sufficient to jeopardize the continued existence of any species.

IMPACTS ON WILD HORSES

Impacts from Proposed Management Actions

Impacts from Wild Horse Management. Continuing to manage the wild horses as outlined in the Little Book Cliffs Wild Horse Management Plan would result in the continuation of a viable herd.

Impacts from Coal Management. Development of existing pre-FLPMA coal leases in lower Coal Canyon would reduce the critical wintering and foaling area by 10 percent. This would have a minor impact on the horse herd, but it would remain viable.

Impacts from Oil and Gas Management. Development of existing leases in the Little Book Cliffs area would detract from the natural character of the horse range but would not significantly impact the herd. This is because nine of the ten pending APDs (see Appendix E) are outside the horse range and the tenth pending APD and the 23 projected APDs would have seasonal stipulations placed on them as a condition of APD approval.

Prohibiting future oil and gas leasing would have minimal impact on the herd because the area is already leased.

Impacts from Forest Management. Limiting fuelwood sales to commercial sales of 30 acres or less would decrease harassment. Sales would also help to increase available forage.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle (ORV) use to existing roads and trails would help to improve forage production and habitat and decrease harassment of the horse herd. Seasonal closure of Coal Canyon would protect the horses during their critical foaling period.

Impacts from Land Tenure Adjustment. Acquisition of 816 acres of private land within the horse range would allow the removal of hazardous barbed wire fencing and allow development of a spring to provide needed water. It would also improve overall management efficiency by eliminating inholdings.

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Impacts from Transportation and Public Utilities Management. Limiting use of all new roads to administrative use only would help to reduce harassment of the horse herd. Allowing no new rights-of-way in the wild horse range would also serve this purpose and would protect available forage.

Cumulative Impacts on Wild Horses

The development of pre-FLPMA oil and gas and coal leases would have a minor impact on the wild horse herd. Seasonal closure of Coal Canyon would protect the wild horses during their critical foaling period. The acquisition of the private land within the horse range would improve the management of the wild horse range. Allowing no new rights-of-way would protect the primitive setting in the horse area.

IMPACTS ON CULTURAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Cultural Resource Management. Actively managing four high value sites (Ladder Springs, Indian Creek, Sieber Canyon, and Sinbad Valley) would provide information necessary to an understanding of prehistoric and historic cultures in the Grand Junction Resource Area. Vandalism, site deterioration, and a loss of opportunity for public education would be decreased through management of these sites.

Cultural clearances in the remainder of the resource area would contribute to the data base and decrease site destruction by surface disturbance. Site specific clearances would also increase the potential for discovery of sites eligible for addition to the National Register. Protecting the remaining 158 high value National Register quality sites and the 141 moderate value sites only to the extent required by law would result in the continued natural deterioration and vandalism of these sites.

Impacts from Recreation Resource Management. Intensive recreation management area designations would cause an increase in unauthorized collecting and site vandalism.

Impacts from Oil and Gas Management. Activities associated with oil and gas development would continue to provide the greatest potential for site destruction, vandalism, and unauthorized collection of artifacts.

Cumulative Impacts on Cultural Resources

Research would continue to be mainly project salvage initiated, and not necessarily scientifically oriented. Other impacts would continue to be the same as those described under Impacts from Proposed Management Actions.

IMPACTS ON RECREATION RESOURCES

Impacts from Proposed Management Actions

Impacts from Recreation Management. Managing two intensive recreation management areas (see Chapter 2, Summary of Management Action, for description and location) would provide greater opportunity for public use of the Dolores, Gunnison, and Colorado Rivers. Designating The Palisade, Dominguez Canyon, and Sewemup Mesa as wildland areas would continue to make the important recreation opportunities in these areas available for public use, as would designation of Black Ridge as recreation land. Managing 265,855 acres of public land as sensitive recreation settings would help to protect these areas from increasing degradation of their outdoor recreation value.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Withdrawing Black Ridge from mineral entry would provide the greatest protection for scenic and other recreational opportunities in this area. Mineral development would continue to degrade the quality of recreation settings in much of the remainder of the resource area. Developing 10 pending and 23 projected applications for permit to drill (APDs) in the Little Book Cliffs area and 33 projected wells in the Demaree Canyon WSA would have little additional impact over that discussed above.

Impacts from Forest Management. Prohibiting fuelwood and sawtimber harvests in Black Ridge recreation lands, the Sewemup Mesa, The Palisade, and Dominguez Canyon wildland areas would help provide more natural recreational settings. Continuing fuelwood and sawtimber harvests in other parts of the resource area would result in a degradation of recreation settings.

Impacts from Wildlife Management. Stipulations protecting critical big game habitat and managing habitat to help improve it for a variety of wildlife and aquatic species would enhance recreational opportunities for wildlife viewing, backpacking, hunting, and fishing.

Impacts from Threatened and Endangered Species Management. Managing resources to pro-

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tect threatened and endangered species would help to maintain the quality of recreation settings.

Impacts from Visual Resource Management (VRM). Protecting scenic qualities of the visual resources through VRM Classes II and III designations would help to ensure continuing availability of high quality, desired recreation settings and opportunities. Black Ridge, Sewemup Mesa, the Dominguez Canyons, and Mount Garfield would receive the greatest protection under VRM.

Impacts from Off-Road Vehicle (ORV) Management. Limiting ORVs to existing or designated roads on 203,686 acres and closing 17,902 acres to ORV use would help reduce surface disturbance resulting in protection of important and desired recreation settings in those areas.

Impacts from Public Utilities Management. Designating 191,119 acres as unsuitable and 618,602 acres as sensitive to public utilities would reduce the degradation of high quality recreation settings in the Dominguez Canyons, Sewemup Mesa, Black Ridge, Granite Creek, Mount Garfield, the Colorado, Dolores and Gunnison Rivers, and Unaweep Canyon.

Cumulative Impacts on Recreation Resource

Effective protection of important desired recreation settings and opportunities would be provided in the Black Ridge/Ruby Canyon, Sewemup Mesa, The Palisade, and Dominguez Canyon areas. In other parts of the resource area, desired recreation settings and opportunities would remain stable except in mineral development areas where degradation is likely.

IMPACTS ON OFF-ROAD VEHICLES

Impacts from Proposed Management Actions

Impacts from Off-Road Vehicle (ORV) Management. Closing 17,902 acres to ORV use would protect fragile resource values from damage by ORVs. Limiting ORV use to designated or existing roads on 192,066 acres would decrease ORV user access and opportunities for cross-country travel. Continuing to direct competitive and intensive ORV use to specified areas on 76,000 acres primarily in or near the Grand Valley would meet current user demand while concentrating most of the intensive use in one general area. Overall, ORV designations would have little effect on existing ORV use patterns.

Impacts from Wildlife and Wild Horse Management. Seasonal closure of 11,620 acres of criti-

cal big game winter range and wild horse winter range would reduce ORV winter use in Little Book Cliffs Wild Horse Range, the Beehive, and Lands End areas, and protect foaling areas in the Coal Canyon portion of the Little Book Cliffs Wild Horse Range. Closure of the Coal Canyon portion of the Little Book Cliffs Wild Horse Range during the spring and early summer occurs during the highest demand period for ORV use in that area. This would result in an annual reduction of 4,500 visitor days of ORV use in Coal Canyon (65 percent of the total).

Impacts from Recreation Management. Limiting ORV use in Black Ridge and the Dominguez Canyons to existing roads would decrease the opportunity for ORV cross-country use.

Cumulative Impacts on Off-Road Vehicle Management.

Closing areas to ORV use because of fragile resource values, seasonal closures to protect cultural values, big game and wild horse winter range, and limiting ORV travel to designated or existing roads on 192,066 acres would have minimal impact on ORV use in all areas except Coal Canyon where the impact would be high.

IMPACTS ON VISUAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Visual Resource Management. Maintaining approximately 26 percent of the resource area (173,374 acres) as visual resource management (VRM) Class II would provide protection for visual resources in Black Ridge, Ruby and Dominguez Canyons, Sewemup Mesa, The Palisade, and Mount Garfield. Designating 161,821 acres as VRM Class III would provide limited protection for visual resources in Unaweep and De Beque Canyons, the Dolores River Canyon, Little Book Cliffs Wild Horse Range, South Shale Ridge, the face of the Book Cliffs and slopes of the Grand Mesa, and Sinbad Valley. Scenic quality in the remainder of the area (944,865 acres) would not be protected from visually contrasting projects or disturbances.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Mineral withdrawals (and concurrent management as VRM Class II areas) in Black Ridge, Ruby Canyon, and at developed recreation sites would provide optimum protection for visual resource qualities in these areas. Minerals development in the remain-

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der of the resource area would continue to degrade visual resources.

Impacts from Forest Management. Harvesting of timber resources, particularly fuelwood, would continue to alter landscape characteristics in the majority of the resource area.

Impacts from Recreation Management. Recreation management would continue to help maintain landscape characteristics that preserve the scenic qualities in the Dolores River Canyon, Dominguez and Ruby Canyons, Sewmup Mesa, The Palisade, and Black Ridge.

Impacts from Off-Road Vehicle Management. Continuing heavy off-road vehicle use throughout the Grand Valley and, in particular, near Mount Garfield would degrade landscape character.

Impacts from Fire Management. Managing wildfires under limited suppression techniques would help improve or maintain natural landscape character.

Cumulative Impacts on Visual Resources

Designating 26 percent of the area as VRM Class II would protect highly scenic visual resources from being degraded. Visual resources in the remainder of the resource area would receive limited protection or no protection from degradation by land use activities incompatible with maintaining high scenic quality.

IMPACTS ON WILDERNESS RESOURCES

The *Federal Land Policy and Management Act* (FLPMA) recognizes that certain uses occurring as of October 21, 1976 (the date FLPMA was passed) have valid existing rights. These rights, referred to as pre-FLPMA rights, allow development of pre-FLPMA leases in wilderness study areas (see Section 3, Appendix E), subject to terms and conditions of the leases. The BLM may regulate development of these leases to prevent undue and unnecessary degradation but may not deny development even if development would impair wilderness characteristics.

Pre-FLPMA oil and gas and coal leases occur in Demaree, Little Book Cliffs and The Palisade Wilderness Study Areas. Impacts of developing these leases were analyzed under all alternatives because of the development rights granted under FLPMA.

Impacts from Proposed Management Actions

Impacts from Wilderness Management. Recommending the seven wilderness study areas to Congress as nonsuitable for wilderness designation would result in their release from wilderness consideration, assuming that the Secretary of the Interior and Congress would adopt these recommendations. Release of the seven WSAs (241,005 acres) from wilderness management would result in a loss of wilderness values and a disruption of natural ecosystems in these wilderness study areas.

Diversity in the National Wilderness Preservation System would not be expanded by failing to add these seven WSAs representative of the Colorado Plateau Ecotype (Pinyon-Juniper Woodland). These are among the last few areas having potential for wilderness designation in west central Colorado. Failing to add them to the National Wilderness Preservation System would result in a permanent loss of wilderness resources. Many of these WSAs contain large, multiple canyon systems that are not similarly represented in areas being studied for wilderness or in the existing wilderness system in Colorado. One WSA contains a very uncommon high pinyon-juniper mesa. Management of the Black Ridge WSAs as recreation lands and The Palisade, Dominguez Canyon and Sewmup Mesa WSAs as wildlands would help minimize impacts to their wilderness values.

Pre-FLPMA oil and gas leases exist on 92 percent of the Demaree Canyon WSA and 85 percent of the Little Book Cliffs WSA (see Figures 4-1 and 4-2). The remainder of these WSAs have post-FLPMA leases. Development of oil and gas and coal leases would result in a loss of wilderness values including size, roadlessness, naturalness and outstanding opportunities for solitude and/or outstanding opportunities for primitive and unconfined recreation. Special features (wild horses, cultural sites and geologic features) in the Little Book Cliffs WSA would also be impaired through surface-disturbing activities. The probability of oil and gas development in the other WSAs would be low except for Sewmup Mesa which would be classified moderate. No oil and gas leases exist in any of these other WSAs except for 120 acres of a pre-FLPMA lease in The Palisade. Overall, impact to wilderness values from oil and gas development in 5 of the 7 WSAs would be estimated to be low.

Mineral development in the Demaree Canyon and Little Book Cliffs WSAs prior to Congressional action on wilderness recommendations would disqualify all or part of these WSAs for wilderness. The extent to which these WSAs would be disqualified would depend upon location of surface facilities and impacts to wilderness characteristics.

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Therefore, for analysis purposes, two geographic zones were delineated as shown in Figures 4-1 and 4-2.

Zone 1. This zone is generally on the periphery of the WSAs. Development with stipulations to prevent undue or unnecessary degradation, would impair wilderness characteristics in the area of development. It would eliminate from consideration as wilderness only the area of development, leaving a manageable unit for potential wilderness designation. Therefore, development within Zone 1 would not constrain the Secretary of the Interior's recommendation to Congress with respect to a manageable area suitable for preservation as wilderness.

Zone 2. This zone is considered the core area of wilderness potential. Development with stipulations to prevent undue or unnecessary degradation, would impair wilderness characteristics and could constrain the Secretary of the Interior's ability to recommend to Congress an area suitable for preservation as wilderness. The potential for wilderness recommendation of this constraint would decrease as development in this area progressed.

Any development in Zone 2 could result in a progressive loss in the WSAs' suitability for preservation as wilderness until Congress' option for wilderness designation is lost. This loss of wilderness characteristics (consisting of sufficient size—5,000 acres or larger, roadlessness, naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation) would result from surface disturbance and the placement of structures associated with development. Special features could also be lost.

The impacts of developing pre-FLPMA coal, oil and gas leases are presented in Impacts from Coal Management and Impacts from Oil and Gas Management.

Under this alternative, the release of the seven WSAs from wilderness consideration and the implementation of proposed actions would have the following impacts on wilderness characteristics in the WSAs.

Impacts from Water Resource Management. A 3-foot cutoff wall and associated facilities (power line, pipeline, and pump) for retention of water in Salt Creek as part of the Sinbad Valley Salinity Project would result in the loss of approximately 15 acres of naturalness on the very northern boundary of the Sewemup Mesa WSA. No other projects are proposed that would impact wilderness resources.

Impacts from Locatable Minerals Management. Closing 68,000 acres to mineral location within the Black Ridge Area would help prevent sur-

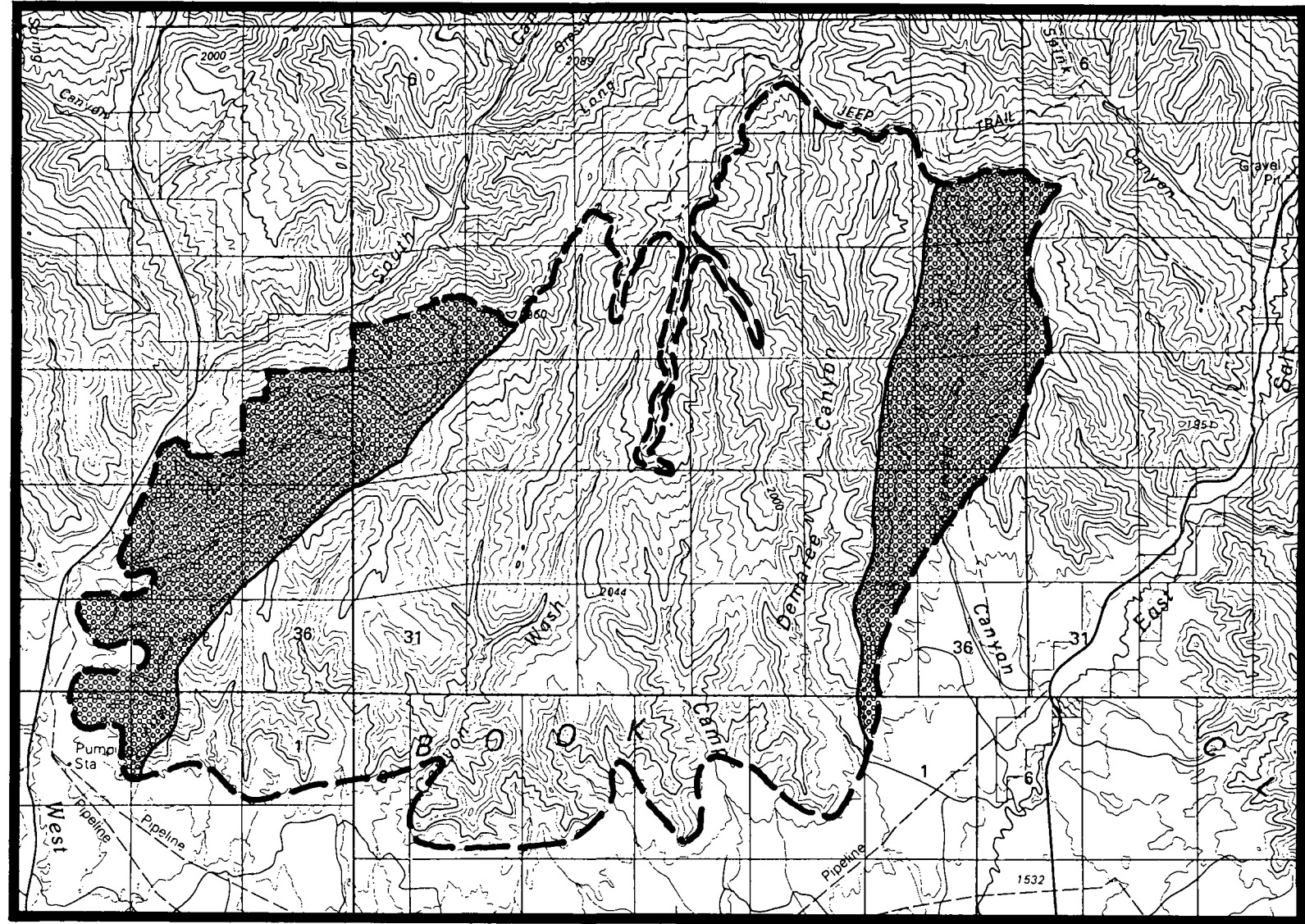
face disturbance and protect the natural character of the area. The remainder of the WSAs (approximately 173,000 acres) would be open to mineral location which would disturb the naturalness in these areas and decrease opportunities to experience outstanding solitude and outstanding primitive recreation. Most WSAs have low development potential for locatable minerals; therefore, the impacts would be minimal. The validity of existing mining claims within WSAs has not been determined.

Impacts from Coal Management. Development of the existing pre-FLPMA coal leases on 222 acres in Demaree Canyon and 1,934 acres in Little Book Cliffs would still allow Zone 2 (core areas, Figs. 4-1 and 4-2) to be preserved. The coal leases are located in Zone 1 in both WSAs and these peripheral areas would be lost where surface development and facilities were located. The likelihood of development of pre-FLPMA coal leases in these WSAs would be low to moderate.

Further coal leasing, exploration and development would impair wilderness values throughout the Demaree Canyon and Little Book Cliffs WSAs (both Zones 1 and 2). Development of coal leases would generally result in loss of naturalness and outstanding opportunities for solitude in areas of development. Outstanding opportunities for primitive recreation would be lost in the Little Book Cliffs WSA, especially in the lower Coal Canyon area where surface mining facilities probably would be located. The presence of 65-120 wild horses in the Little Book Cliffs WSA is a major supplemental value attracting recreationists to the wild horse range. Coal development in lower Coal Canyon could seriously impact the horse herd in this critical winter range and foaling area. Any loss of the herd would directly lessen the outstanding primitive recreation opportunities associated with viewing and photographing the herd.

Impacts from Oil and Gas Management. Impacts from the development of the oil and gas leases in the Demaree Canyon and Little Book Cliffs WSAs is generally described in the section Impacts on Wilderness Management. BLM has estimated there will be 33 wells, 33 miles of new roads and 33 miles of pipelines (generally along roads) developed in the Demaree Canyon WSA in the next 20 years. Similar estimates for the Little Book Cliffs WSA include 31 wells, 31 miles of roads and 31 miles of pipelines. Roads, well pads, and pipelines from this development would segment the WSAs into smaller parcels, modify the natural landscape and disrupt opportunities to experience outstanding solitude or outstanding primitive and unconfined recreation.

Although the likelihood for oil and gas development is high in the Demaree Canyon and Little



Continuation of Current Management Impacts

T 7 S

T 8 S

LEGEND

--- WSA Boundary

Zone 1

Zone 2

1 1/2 0 2 3 Miles



Figure 4-1. Geographic Zones, Demaree Canyon Wilderness Study Area.

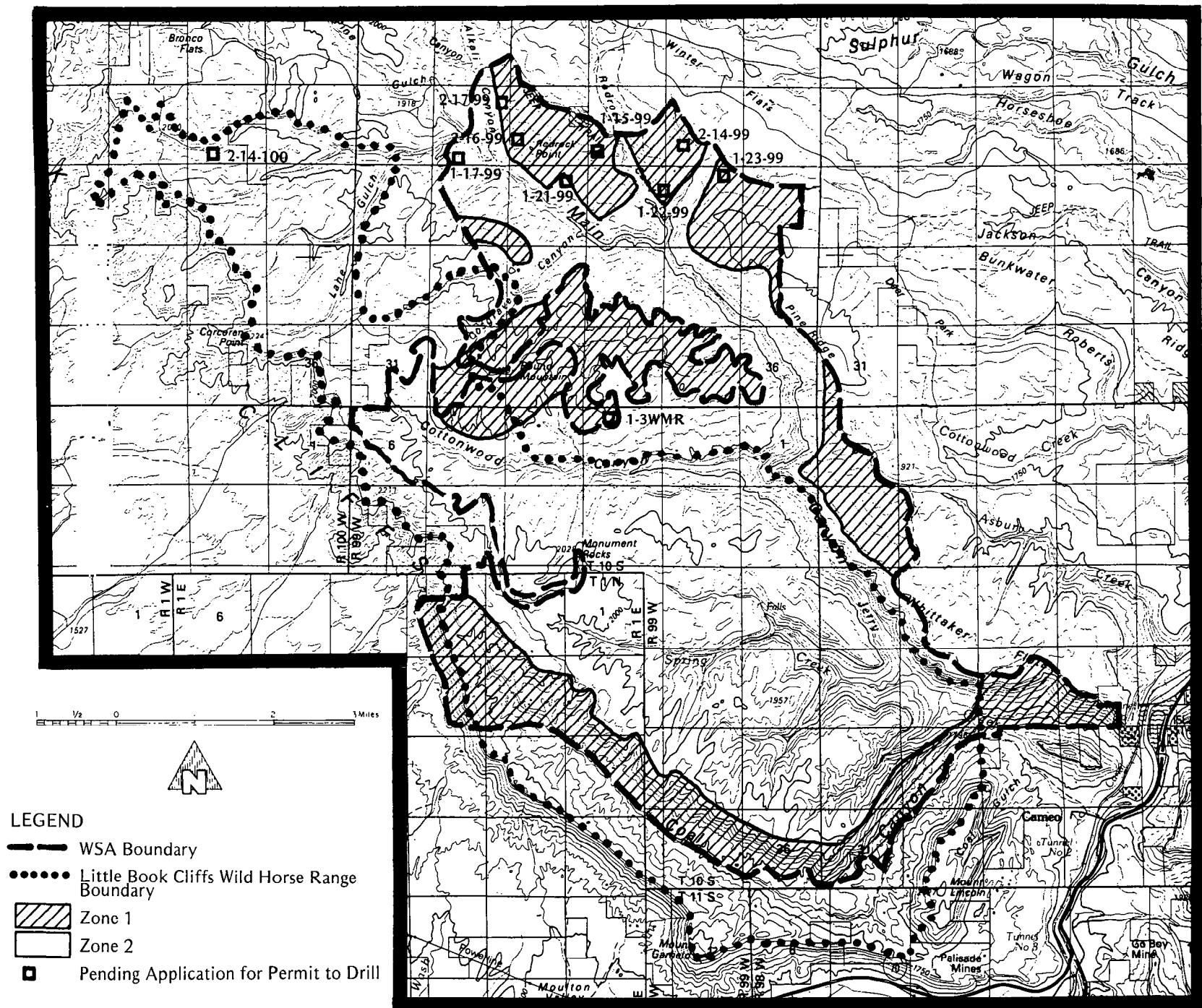


Figure 4-2. Geographic Zones, Little Book Cliffs Wilderness Study Area.

Continuation of Current Management Impacts

Book Cliffs WSAs, it is low in all the other WSAs except Sewemup Mesa. Sewemup Mesa has a moderate potential for development. Other than Demaree Canyon and Little Book Cliffs WSAs, only The Palisade WSA has an oil and gas lease. It is a pre-FLPMA lease covering 120 acres.

Development of ten pending APDs (Fig. 4-2, Chapter 4) in the Little Book Cliffs area would result in the following impacts: Development of the two APDs outside the WSA would have no impacts on wilderness characteristics. Development of seven APDs within Zone 1 would eliminate this area of development (62 acres) from wilderness consideration. However, development of these seven APDs would not constrain Congress from designating all or part of Zone 2 as wilderness. Development of one APD (9 acres) within Zone 2 would have major impacts on wilderness characteristics. Development of this APD could constrain Congress from designating a portion of the WSA as wilderness. However, because of the location of this APD, a manageable unit would still be available for Congressional consideration. Further well development on pre-FLPMA leases could make the entire WSA unsuitable for wilderness designation.

Impacts from Mineral Materials Management. Mineral materials sales in four of the WSAs would disturb the naturalness of these areas. Closing the Black Ridge Canyons WSA and the wild horse portion of the Little Book Cliffs WSA (approximately 18,000 acres) to minerals sale would prevent surface disturbance by preventing road development and material removal.

Impacts from Forest Management. Timber harvesting and associated road construction would result in a loss of naturalness and a reduction of opportunities to experience outstanding solitude and outstanding primitive recreation. This would occur as follows: Demaree Canyon WSA—937 acres, Little Book Cliffs WSA—6,639 acres, and The Palisade WSA—797 acres. Timber harvesting would not occur in the Black Ridge Canyon WSAs, Dominguez Canyon WSA, and Sewemup Mesa WSA because they would be managed to protect their recreation and wildland values.

Impacts from Wildlife Management. Vegetation treatments (up to 300 acres) to change pinyon-juniper woodlands to shrubs and grasses would impact the naturalness of the Black Ridge Canyon and Dominguez Canyon WSAs. The actual location and method of treatment (mechanical, chemical, or fire) would vary the degree of each unit's naturalness.

Impacts from Livestock Grazing Management. The construction of a livestock trail in the Dominguez Canyon WSA would reduce the naturalness and scenic values of the area. The trail would be visible for several miles in Big Dominguez Canyon

and would be located directly above a heavily used recreation area of the canyon. Outstanding opportunities for primitive and unconfined recreation in lower Big Dominguez Canyon would also be diminished. Impacts from motorized access and use of mechanical equipment for project maintenance by grazing operators would periodically decrease outstanding opportunities for solitude in all WSAs. No impacts from range management occur on the top of Sewemup Mesa WSA because the area is closed to grazing.

Impacts from Wild Horse Management. Management of the wild horses in the Little Book Cliffs WSA would periodically decrease the outstanding opportunities for solitude. This would occur anytime mechanical equipment, especially helicopters, was used in the roundup of horses. Vehicle tracks would reduce the naturalness of the area, especially where vehicles traveled off of existing ways.

Impacts from Recreation Resource Management. Managing Black Ridge, Dominguez Canyon, and Sewemup Mesa as wildland areas would help protect wilderness values in those areas following release from wilderness consideration.

Impacts from Off-Road Vehicle Management. Management of the Demaree Canyon and The Palisade WSAs as open to off-road vehicle (ORV) use would decrease the naturalness of the areas and diminish outstanding opportunities for solitude. Management of the Black Ridge WSAs as limited to existing roads and trails would also decrease the outstanding opportunities for solitude, as well as outstanding opportunities for primitive and unconfined recreation. Closing the Dominguez Canyon and Sewemup Mesa WSAs to ORVs would maintain the naturalness and outstanding opportunities for solitude in these areas.

Impacts from Public Utilities Management. Management of the Little Book Cliffs WSA, the canyons of the Black Ridge WSAs, the central portion of The Palisade WSA, Dominguez Canyon WSA, and Sewemup Mesa WSA as unsuitable for utilities would help maintain the natural character of the areas and outstanding opportunities for solitude and primitive and unconfined recreation. New rights-of-way in the Demaree Canyon WSA and portions of the Black Ridge Canyons WSAs and The Palisade WSA would result in a loss of naturalness and loss of outstanding opportunities for primitive recreation in the area of the rights-of-way. Rights-of-way could also divide WSAs and decrease their size.

Impacts from Fire Management. Fire control which requires the use of bulldozers would impair the naturalness of any area in which this was necessary. Mechanical equipment such as chain saws

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and pumper trucks would also impair the naturalness in the area of a fire.

Cumulative Impacts on Wilderness Resources

Nonsuitable wilderness designations on all seven WSAs would result in a loss of naturalness and outstanding opportunities for solitude and primitive and unconfined recreation on about 175,000 acres. This would result in a permanent loss of these potential wilderness areas in west central Colorado. The only exceptions to the loss would be the canyons of Black Ridge Canyons WSAs, Dominguez Canyon WSA, and the mesa top of Sewemup Mesa WSA where special management has been identified to maintain wildland values. Although the rocky spine of The Palisade WSA has been protected for its scenic and geologic values, it alone would not qualify for wilderness.

IMPACTS ON SOCIAL AND ECONOMIC CONDITIONS

Impacts from Proposed Management Actions

Impacts from Water Resource Management. Projects to reduce sediment yield and salinity would contribute to lower water treatment costs downstream. The anticipated salinity reduction of 900 to 1,100 tons per year would eventually reduce salinity costs in the lower Colorado River basin by \$50,000 to \$60,000 annually. Local benefits would result from increased soil productivity and reduced facility treatment costs (e.g., less frequent removal of reservoir sedimentation). Some or all of the economic benefit would be offset, however, as a result of sediment and salinity increases due to activities associated with management of other resources.

Impacts from Coal Management. The exclusion of 38,521 acres from further leasing consideration would not likely have local social or economic impacts since it would not affect production levels during the life of the plan. However, because several of the areas proposed for exclusion—the Palisade watershed and the Little Book Cliffs Wild Horse Range—are adjacent to existing mines and leases, potential expansion areas would be removed. This could adversely affect mine operators and lease holders when the currently leased resource is mined out (in 20 to 40 years) or if expansion were sought to produce a more economic unit.

Impacts from Oil and Gas Management. Stipulations placed on oil and gas leases in the Grand Junction Resource Area would unlikely have measurable social or economic impacts. Most of the

moderate to high potential oil and gas lands are already leased, and new stipulations would not apply to their development. To the extent that restrictive lease terms do affect drilling operations, costs would increase, creating the potential for lower production and reduced royalty revenue to the federal government and Colorado. Any impacts would be felt more by individual lease holders than by the local oil and gas industry since the industry is more reliant on production in eastern Utah and other parts of western Colorado than upon production in the resource area.

Approval of ten pending APDs in the Little Book Cliffs area could result in annual gas sales of about \$800,000. In addition to generating \$100,000 in royalty payments, those sales would support six jobs and over \$100,000 in local income. The potential drilling of 23 more gas wells in the Little Book Cliffs WSA would result in just over twice the economic impacts created by the pending applications.

Impacts from Forest Management. The sale of 2,600 cords of fuelwood annually would help offset residential energy costs and produce about \$13,000 in federal revenues. To the extent purchases were by commercial fuelwood cutters, local employment and income would be supported.

Impacts from Wildlife Management. Efforts to increase forage available for big game would work toward reduced crop losses by owners of farms and orchards in critical winter range areas. To the extent that increased forage translated into larger big game populations, benefits could be felt in the economic sectors dependent on hunting and non-consumptive uses of big game.

Impacts from Land Tenure Adjustments Social and economic impacts of land tenure adjustments cannot be estimated because they would occur on a case-by-case basis. However, as activity in this area has been limited in the past, sizeable impacts in the future are not anticipated.

Cumulative Impacts on Social and Economic Conditions.

The cumulative impact on the local economy is likely to be beneficial but not large. Some individuals, particularly oil and gas and coal lease holders, may be adversely affected by restrictions found in this alternative.

Commodity Alternative Impacts

IMPACTS ON TRANSPORTATION

Impacts from Proposed Management Actions

Impacts from Transportation Management. Providing 17 miles of additional public roads, .5 mile of additional public trails, and acquiring 4 new easements would not satisfy most demands for access by the public and BLM.

This alternative would provide additional public access to public land. However, the resulting increase would be low. Several large areas of public land blocked by private land would remain closed to the public for fuelwood, rockhounding, sightseeing, hunting, fishing, and the like.

The limited additional access would aid the various resource programs to a minor degree.

IMPACTS ON PUBLIC UTILITIES

Impacts from Proposed Management Actions

Impacts from Public Utilities Management. Classifying public land as suitable (470,099 acres), sensitive (618,842 acres), and unsuitable (191,119 acres) would provide utility companies with information with which to plan and design utility projects. This would save both the utility companies and the BLM time and money by not having to redesign projects.

COMMODITY ALTERNATIVE IMPACTS

IMPACTS ON AIR QUALITY

Impacts from Proposed Management Actions

Short-term localized impacts on air quality would result from vegetation manipulation practices. These impacts would be small in scale and dispersed throughout the resource area. These factors combined with required management stipulations for vegetation manipulations would reduce the significance of the impacts.

Increasing off-road vehicle use in intensive management areas would increase soil erosion and fugitive dust emissions. Dust suppression control devices would be impractical.

Cumulative Impacts on Air Quality

Increased levels of air pollution are anticipated from regional growth and energy minerals development. Emissions from primary sources would be minimized through applicable policies, regulations, and statutes.

IMPACTS ON SOILS

Impacts from Proposed Management Actions

Measures to control sediment production on 175,600 acres of critically or severely-eroding soils would reduce soil loss in these areas by an estimated average of 0.1 to 1.0 ton per acre per year. Reductions in soil loss would help improve water quality, particularly in the Colorado River (see Impacts on Water Resources). Treatment of approximately 800 acres to reduce soil erosion in Cactus Park would help to reduce sediment yield, stabilize gully erosion, and increase vegetation cover on those areas.

Expansion of the acreage included in intensive recreation management areas (IRMAs) would increase use by off-road vehicles and other recreational activities, reducing soil productivity and increasing soil erosion. Recommending all wilderness study areas as nonsuitable would open these areas to additional surface-disturbing activities and would increase soil erosion.

Exploration and development for oil and gas, locatable and salable minerals, and emphasizing forestry production would increase the potential for soil erosion and sediment yield by 0.1 to 1.0 tons per acre disturbed per year over that under the Continuation of Current Management Alternative. This would cause primarily short-term losses in soil productivity. Allowing surface occupancy on 18,000 acres of high soil slump area in the Baxter/Douglas Pass area and on 860 acres in the Plateau Creek area would greatly increase sediment yield, loss of vegetative production, and loss of property.

Development of ten pending APDs in the Little Book Cliffs area would increase soil erosion and sediment yield until well sites and access roads were reclaimed. Drilling 23 projected wells in the Little Book Cliffs WSA would further increase soil erosion and sediment yield. Development of 33 new wells in the Demaree Canyon WSA would also increase short-term soil erosion until successful reclamation took place. In addition, a number of well sites could potentially be located on soils having an extremely high probability of slumping when cuts are made in the sideslopes. Loss of the

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well pad site and access road could occur, along with extensive slumping and soil erosion in the adjacent area.

Cumulative Impacts on Soils

Cumulative impacts would include an expansion in areas of surface disturbance and an increase in soil erosion and sediment yield by as much as one ton per acre disturbed per year. Only a portion of this increase would enter the Colorado River. Watershed treatment projects could potentially reduce the total amount of sediment entering the river system. Potential loss of property and life would be increased by allowing surface occupancy on the Baxter/Douglas Pass soil slump area (18,000 acres).

IMPACTS ON WATER RESOURCES

Impacts from Proposed Management Actions

Impacts from Water Resources Management. Treating selected lands in the resource area with watershed improvements would reduce sediment yield from these areas by 1 to 6 tons per acre per year and result in a total resource area-wide salinity reduction of 2,500 to 10,000 tons per year.

Stream stabilization work along 55 miles of severely-eroding stream channels would attempt to reduce sediment (and salinity in some cases) by about one-third.

Maintaining the check and retention dams in Indian Wash and Leach Creek (spread over approximately 6,000 acres) would provide water quality and flood control benefits. An estimated 15,000 to 20,000 tons of sediment and 800 to 1,000 tons of salt would be prevented from entering the Colorado River annually. Flood control benefits to Grand Junction would continue.

Limiting surface disturbance in the Palisade municipal watershed would help to protect that town's water supplies. Similarly, the no surface occupancy stipulation for oil and gas development on the BLM part of the Grand Junction municipal watershed would help protect the water quality of their supplies.

Management of Badger Wash as a hydrologic research area (685 acres) would enable the BLM to study the impacts of surface-disturbing activities. In particular, by leasing the area for oil and gas development and controlling that development, the BLM can quantify the impacts of oil and gas development on sediment and salinity yield of the Mancos Shale.

Restricting development within wetlands and 100-year flood plains would provide important wildlife and flood protection benefits associated with wetlands and flood plains.

Impacts from Locatable Minerals Management. By opening an additional 68,000 acres to location, water quality degradation would occur. Impacts would be the same as in the continuation of current management alternative, but over a potentially larger area. The major impact would be to water quality from increased sediment caused by additional roads. Impacts are impossible to quantify without actual mine locations. The magnitude of the impact on water resources would depend on the mining facilities' design and location. Well-designed roads located away from streams would have little impact compared to a road constructed adjacent to a stream.

Impacts from Coal Management. The impacts of identifying 350,389 acres as acceptable for further coal leasing consideration would be similar to those discussed under the Continuation of Current Management Alternative. However, an additional 24,421 acres (the Little Book Cliffs Wild Horse Range) would be subject to water quality impacts of coal mining under this alternative. These impacts include increased sediment and salinity from construction of mining roads and surface facilities. Potential water quality degradation could occur from spoil pile runoff. Changes in ground water quality and flow regime could result from underground coal mining activities. Mitigation would be imposed to minimize these impacts.

Eliminating 14,100 acres from further coal leasing consideration based on a coal unsuitability review (Table D-3, Appendix D) would eliminate water quality impacts associated with coal mining. Sub-surface mining in the Colorado River corridor and Palisade municipal watershed could create significant subsidence with surface expression. This could result in loss of some or all of the perennial stream flow in the municipal watershed and in the Colorado River by leakage to the mining zone. The Palisade municipal supply could thereby be lost or reduced. Designating these areas unsuitable would prevent these impacts from occurring.

Allowing pre-FLPMA coal leases to develop in the Palisade municipal watershed would not affect Palisade's water supplies. This portion of the watershed is mainly used for water transmission facilities. Cabin Reservoir also partly overlies this lease. By not mining directly under the streams or reservoirs, no impacts on the reservoirs or streams from subsidence should occur. Any impacts to the transmission facilities could quickly be remedied by the coal company responsible. Any site-specific impacts of

Commodity Alternative Impacts

developing this lease would be addressed when a mine plan was submitted.

Impacts from Oil and Gas Management. Impacts of placing 1,125,664 acres in a standard lease terms category, and placing 0 acres in the no leasing category would allow water quality impacts to occur from oil and gas development. Oil and gas activities require construction of roads, drill pads, and pipelines. This surface disturbance often results in increased sedimentation and occasionally increased salinity entering surface waters. These water quality impacts generally decrease to preconstruction levels following rehabilitation. This alternative would allow 111,838 acres previously under no lease in the Continuation of Current Management Alternative to be developed.

Placing 1,255 acres in the Indian Wash dam, Badger Wash hydrologic study area, and Grand Junction municipal watershed in the no surface occupancy category for water resource protection would eliminate onsite adverse water quality impacts from oil and gas drilling. Water quality impacts that are eliminated by the no surface occupancy stipulation include heavy metal and total dissolved solids contamination from reserve pit leakage and sedimentation increase associated with site (drill pad) preparation. Potential water quality impacts (e.g., sedimentation) could occur from road and pipeline construction, however.

Placing the Palisade municipal watershed (14,000 acres) in the special stipulations category would minimize potential water quality and quantity impacts.

Development of the ten pending APDs in the Little Book Cliffs area and the projected 23 APDs in the Little Book Cliffs Wilderness Study Area would disturb an estimated 235 acres for road, drill pad, and pipeline construction. This surface disturbance would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Further water quality impacts could occur from reserve pit leakage causing increased levels of total dissolved solids and heavy metals in receiving waters. Potential sediment impacts occurring from approximately 120 acres would decrease to near predevelopment levels following successful rehabilitation. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Developing 33 projected new wells in Demaree Canyon Wilderness Study Area would disturb approximately 250 acres for road, drill pad, an pipeline construction. These construction activities would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Additional water quality impacts could occur

from reserve pit leakage causing elevated total dissolved solids and heavy metal levels in receiving waters. Potential sediment impacts occurring from approximately 125 acres would decrease to predevelopment levels as the area was rehabilitated. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Impacts from Mineral Materials Management. Approximately 94,946 more acres would be open under this alternative than in the Continuation of Current Management Alternative. Thus, there is slightly more potential for short-term water quality degradation, mostly from sediment.

Impacts from Forest Management. The additional 18,000 acres of pinyon-juniper woodlands deemed suitable for forest management would increase the potential water quality impacts from timber harvesting. The increased sediment yield could be limited to 5 percent or less with proper mitigation and design.

Impacts from Wildlife Management. Vegetation modification on 2,400 acres would cause some short-term (until the vegetation is reestablished) water quality impacts. Leaving untreated buffer strips between the treatment area and any streams would minimize these impacts.

The protection of riparian habitat, improvement of fisheries, protection of critical winter range and calving grounds should all help protect water resources by preventing much surface disturbance, especially in the riparian zones.

Impacts from Recreation Resource Management. Redirecting and increasing use of public lands for recreation purposes would increase water quality problems associated with human use. Human use, through increased surface disturbance, increases sediment and salinity yield. Increased human use also poses a small risk of increased biological contamination of surface waters. The magnitude of any quality problems would depend on the use patterns. Heavy use areas have much greater problems than lightly used areas.

Impacts from Visual Resource Management. Removal of visual resource management restrictions would permit additional development and, thus, surface disturbance. Sediment and salinity yield would increase by an unquantifiable amount. Site specific information would be needed to quantify amounts.

Impacts from Off-Road Vehicle Management. The acreage open to off-road vehicles does not significantly change over continuation of current management levels, so the impacts would be the

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same. Off-road vehicle use would cause accelerated erosion in heavy use areas. Even lightly used areas would also experience increased sediment and salinity yield, but not to the same degree as heavily used areas.

Impacts from Special Management Areas.

Designation of approximately 19,000 acres as areas of critical environmental concern would reduce sediment yield (actual and potential) by restricting surface disturbance on highly-erosive sites in Cactus Park and the Baxter/Douglas Pass area.

Impacts from Transportation Management.

Acquiring new public access to many places presently not having legal access would degrade water quality. A 5 to 10 percent sediment increase would result from increased vehicle travel. The cumulative effect on water resources would be low.

Impacts from Public Utilities Management.

Identifying 511,443 acres as sensitive to public utilities (107,399 fewer than under the Continuation of Current Management Alternative) would not decrease the potential of water quality impacts appreciably. Many of the unsuitable or sensitive designations are based on land use decisions and not environmental considerations. Therefore, a new route could be less environmentally sound and cause more water quality problems, mostly sediment. Thus, the net effect on water resources cannot be calculated without site-specific information.

Impacts from Fire Management. Fire management, under this alternative, is similar to that under continuation of current management; but the re-introduction of a fire-dependent ecosystem would cover a slightly larger area. Fire causes a short-term increase in sediment and nutrients yielded to streams because of the loss of vegetation. As the vegetation reestablishes, water quality problems usually decline rapidly.

Cumulative Impacts on Water Quality

Under this alternative, the resource area would have a cumulative decrease in sediment and salinity yield to the Colorado River. The exact magnitude of this decrease is unquantifiable at this time. It would depend on the reductions in sediment and salinity that watershed rehabilitation treatments can accomplish on the 214,000 acres of the resource area yielding high levels of salt or sediment. This would not be known until area-specific activity plans are developed.

Slightly offsetting these decreases would be some additional sediment and salinity yields from increased development. Most of these effects would come from roads and other surface disturbances resulting from increases in oil and gas, for-

estry, and off-road vehicle activities. Due to the localized nature of these activities, certain heavily used areas would receive larger increases than others.

IMPACTS ON LOCATABLE MINERALS

Impacts from Proposed Management Actions

Impacts from Locatable Minerals Management. Identifying 1,334,548 acres as open to location would make this acreage available for exploration and development of locatable minerals under the general mining laws. Compared with the Continuation of Current Management Alternative, an additional 68,000 acres would be open to location.

Continuing current withdrawals on 124,843 acres would eliminate those areas from location.

IMPACTS ON COAL

Impacts from Proposed Management Actions

Impacts from Coal Management. Identifying 350,389 acres of public minerals as acceptable for further coal leasing consideration would make an estimated 4,161 million short tons of in-place (measured, indicated and inferred) coal available for leasing. The resource estimates are based on information from Schwochow (1978) and Hornbaker, et al (1976). This is an increase of 24,421 acres and 321.4 million short tons of in place coal over the Continuation of Current Management Alternative as available for further leasing consideration.

Impacts from Coal Unsuitability Recommendations. Identifying 14,100 acres of public minerals as unsuitable for further coal leasing would eliminate an estimated 185.5 million short tons in place from leasing. The impact of eliminating both the Colorado River corridor (4,100 acres) and the Palisade municipal watershed (10,000 acres) from further leasing would be low. Coal companies would have difficulties removing the coal beneath the Colorado River. Only one coal company with a lease on a portion of the Palisade municipal watershed has expressed any interest in additional leasing. The leases in this area have an estimated 40 years of reserves based on present production levels from the company producing in the area. Allowing coal surface facilities in the Colorado River corridor would make it possible for adjacent coal lands to be developed.

Commodity Alternative Impacts

Impacts from Oil and Gas Management. Leasing and subsequent development of oil and gas in the same areas identified as acceptable for further coal leasing consideration (350,389 acres) could reduce considerably the amount of coal available for mining. The amount of coal unavailable for mining would depend on various unknown factors, such as the scope and timing of development of both resources and the amount of coal required to be left as pillars around existing oil and gas wells. No projections on coal loss around oil and gas wells have been made for coal leasing areas. However, a conflict could exist between coal and oil and gas if sufficient amounts of coal were required to be left in place so as to make the area uneconomical to mine. Any conflict would be resolved prior to coal leasing.

Developing ten applications for permit to drill (APDs) and 23 projected wells in the Little Book Cliffs area would have the following impacts: All ten APDs are located within the area found acceptable for further coal leasing consideration under this alternative. Therefore, the ten pending APDs and the 23 projected APDs would conflict with coal development because a pillar of coal would have to be left around each producing well during simultaneous development of coal and oil and gas. The amount of coal left around each well would vary considerably depending upon the method of calculation. The Bureau of Mines requires a 150-foot-radius (300-foot-square pillar) of coal left around each producing well. For each producing well this would result in an average coal loss of 29,000 tons of in-place coal, or 290,000 tons of in-place coal for

the ten pending APDs and 667,000 tons for the 23 projected wells for a total loss of 954,000 tons of in-place coal. This loss would be minor. The Colorado Mined Land and Reclamation Board might require using a 21 degree angle of draw from the coal bed to the surface. Using this method, each producing well would result in an average loss of in-place coal of 480,000 tons per well, or 4,320,000 tons for the ten pending APDs and 11,040,000 tons for the 23 projected wells, for a total loss of in-place coal of 15,360,000 tons. This would be a high impact and might result in the area being uneconomical to mine.

Developing 33 projected wells in the Demaree Canyon WSA would result in the following impacts: Leaving coal around producing wells as required by the Bureau of Mines could result in the loss of 57,000 tons of in-place coal. Using the possible requirements of the Colorado Mined Land and Reclamation Board, the resultant loss would be 15,840,000 tons of in-place coal. The Colorado Mined Land and Reclamation Board method would be a high impact that might result in the area being uneconomical to mine.

IMPACTS ON OIL AND GAS

Impacts from Proposed Management Actions

Impacts from Oil and Gas Management. Table 4-2 lists the development potential within each leasing category.

Table 4-2. Development Potential by Leasing Categories

Lease Category	Oil and Gas Development Potential (Acres)			
	High	Moderate	Low	Total
No Leasing.....	0	0	0	0
Leasing with Stipulations				
No Surface Occupancy.....	7,844	1,179	819	9,842
Other Stipulations.....	245,558	29,713	48,614	323,885
Standard Lease Terms.....				1,125,664

Note: Table 2-6, Chapter 2, identifies oil & gas leasing restrictions by resource concerns and by alternative.

Making approximately 1,125,664 acres available for lease with only standard lease terms would allow exploration and development with few restrictions. Compared with the Continuation of Current Management Alternative, an additional 517,221 acres (an 85 percent increase) would be available for lease with standard lease terms only.

Making approximately 7,844 acres with high development potential and 1,179 acres with moderate development potential available for lease with the no surface occupancy (NSO) stipulation would result in higher drilling and development costs, as directional drilling would be necessary. High drilling and development costs might result in limited activity and foregoing some oil and gas reserves. Making

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approximately 819 acres with low development potential available for lease with the NSO stipulation would have little effect as it is unlikely that any development would occur on these lands. Compared with the Continuation of Current Management Alternative, approximately 33,597 acres less would be subject to the NSO stipulation (77 percent decrease). Of this acreage, approximately 13,291 acres have high development potential, 12,558 acres have moderate potential, and 7,748 acres have low development potential.

Making approximately 245,558 acres of high and 29,713 acres of moderate development potential lands available for leasing with other stipulations might result in some higher costs and scheduling inconveniences for development projects but probably would not result in foregoing oil and gas reserves. Making approximately 48,614 acres with low development potential available for lease with other stipulations would probably not affect development as it is unlikely that such projects would occur. Compared with the Continuation of Current Management Alternative, approximately 115,447 fewer acres (26 percent decrease) would be subject to other stipulations. Approximately 125,588 fewer acres would be subject to other stipulations on lands with high development potential, while 3,517 less acres with moderate potential and 13,658 more acres with low potential would be subject to special stipulations.

Impacts from Coal Management. Mining of coal might result in delays in drilling schedules, higher drilling and development costs, and the use of special techniques or alternate drilling sites. Mining might also damage existing wells. If the potential gas producing zone is a minable coal bed, mining might remove or reduce the gas resource.

IMPACTS ON MINERAL MATERIALS

Impacts from Proposed Management Actions

Impacts from Mineral Materials Management. Identifying 1,450,511 acres as open would make that acreage open for mineral material sale and free use permits. This would allow companies and individuals to submit applications for removal of mineral materials on 99 percent of the resource area.

Continuing to close 6,188 acres and closing an additional 2,692 acres would eliminate a total of 8,880 acres from consideration. Compared to the Continuation of Current Management Alternative, 94,946 fewer acres would be closed. These closings would not be significant for the entire resource

area but could be significant for isolated site-specific areas.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Paleontological Resource Management. Surveys in Class I areas would significantly decrease the possibility of fossil destruction by surface-disturbing activities because these areas have a very high probability of fossil occurrence. Protection of fossils discovered through such activities would preserve them for use in interpreting the fossil record.

Because surveys would not be required in Class II and Class III areas, the potential for destruction of fossils would be increased. These areas, however, have a much lower probability for fossil occurrence.

Implementation of the Rabbit Valley Paleontological Management Plan would provide additional information for interpreting the fossil record and greater opportunity for public education.

Impacts from Oil and Gas, Mineral Materials, and Public Utilities Management. Opening the Rabbit Valley Paleontological Site to placement of oil and gas surface facilities and public utilities and identifying 280 acres in Rabbit Valley and 280 acres at the Fruita paleontological site as available for mineral material removal would significantly increase the probability of fossil destruction.

Impacts from Off-Road Vehicle Management. Leaving Rabbit Valley open to off-road vehicle use would increase the chances for fossil destruction and reduce the effectiveness of a paleontological management plan. The Fruita Paleontological Site would remain closed to off-road vehicle use, providing a high degree of protection to fossils at that site.

Cumulative Impacts on Paleontological Resources.

Opening the Rabbit Valley site to oil and gas facilities and public utilities and allowing mineral material removal from the Fruita and Rabbit Valley sites would allow a greater possibility for fossil destruction than would occur under the Continuation of Current Management Alternative.

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IMPACTS ON FORESTRY

Impacts from Proposed Management Actions

Impacts from Forest Management. Management of 18,186 additional acres of productive pinyon-juniper woodland (127,236 acres total) would increase the annual harvest of fuelwood approximately 20 percent to 3,200 cords.

Silvicultural practices that include clearcutting, shelterwood and selective cutting, and commercial thinning would help to maintain the health and increase productivity of the forest resource. Overmature stands would be harvested and allowed to naturally reforest with younger, more vigorous trees.

Impacts from Locatable Minerals and Oil and Gas Management. Locatable minerals development could destroy the forest resource in areas where they overlap. Uranium mining could reduce the amount of pinyon-juniper under management by as much as 25 percent in some areas. Much of the loss would begin to be recovered in 25 to 35 years.

Oil and gas activity could cause the annual loss of 70 acres of forest land. This land would be out of production for up to 60 years for a producing well and 30 years for a dry hole. The ten pending APDs in the Little Book Cliffs area, the 23 projected gas wells in the Little Book Cliffs Wilderness Study Area, and the 33 projected wells in Demaree Canyon Wilderness Study Area are included in this acreage. This development would result in no significant impacts.

Impacts from Livestock Grazing Management. Maintenance of the existing chainings (done in the 1960s) would result in the permanent loss of approximately 9,000 acres of productive pinyon-juniper woodland, with a large percentage of this area having some of the highest production potential in the resource area.

Impacts from Wild Horse Management. Limiting sales in the Little Book Cliffs Wild Horse Range to commercial sales of no more than 30 acres would have no significant impact on meeting public demand at the present time. When fuelwood demand exceeds the supply capability of areas outside the wild horse range, however, this restriction could have a significant impact.

Impacts from Land Tenure Adjustments. Disposal of 41,550 acres of public land would result in the loss of 1,250 acres of productive pinyon-juniper woodlands and 1,800 acres of commercial forest land.

Approximately 400 acres of productive pinyon-juniper woodlands would be acquired in the Indian Park area.

Impacts from Transportation Management. Exclusive easements to the town of Palisade for use of the Rapid and Cottonwood Creek roads in the Palisade municipal watershed would close the use of these roads for the removal of timber from 402 acres of commercial forest land and from 805 acres of productive pinyon-juniper woodlands.

Cumulative Impacts on Forestry

Intensive management would occur on 127,236 acres of productive pinyon-juniper woodlands or 95 percent of the productive pinyon-juniper woodlands. Intensive management would improve the health and vigor of stands and increase productivity over the long run.

IMPACTS ON WILDLIFE

Impacts from Proposed Management Actions

Impacts from Wildlife Management. Public land habitat for deer and elk populations could be up to 20 percent short of meeting Colorado Division of Wildlife goals by 1988 to 1990. Increases in forage for deer and elk in the Dominguez Canyons and Gateway areas would be offset by a decline in the big game herds north of the Colorado River and east of the Gunnison River. Areas where deer and elk would be managed as key species would increase to include 86 percent of the resource area. Site specific impacts from increasing forage production by the various methods listed in Appendix B would be analyzed in the habitat management plans.

Habitat management to maintain forage for big-horn sheep would allow each of the two reintroduced herds to reach a population of 100 animals by 1990. Habitat treatments would increase populations of sharp-tailed and sage grouse on Glade Park, and protection of habitat for the wild turkey on the Dominguez and Calamity Mesa areas would assist the Colorado Division of Wildlife in fostering levels that would allow hunting of these game birds.

Habitat improvement projects (where needed) on 97 miles of stream would increase fish production by 50 to 200 percent. Since the fish potential on public land streams is not large compared to the potential on streams of forest and private land, this impacts would be modest. Riparian habitat would be reduced by 10 percent to 2,250 acres as a result of the loss of protective stipulations.

Impacts from Threatened and Endangered Species Management. Limiting surface-disturbing

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activities to protect wintering bald eagles along the Colorado River below Fruita would also decrease harassment and poaching of the resident deer population during winter months and would help to maintain the herd, which amounts to 2 percent of the total population in the resource area.

Maintaining a larger prairie dog colony for benefit of the potential existence of black-footed ferrets would not only provide more food for raptors on the sensitive list but also for furbearers such as coyotes, badgers, and weasels. This would help to stabilize or even increase their populations.

Impacts from Water Quality Management. Construction of retention dams on Leach Creek would provide up to 200 additional acres of important waterfowl resting areas (spring and fall), expanding the area with public access. Most of the access to waterfowl habitat is through private land. This would be a moderate improvement in public access.

Watershed treatment on 71,900 acres would increase forage production and extend waterfowl feeding and resting areas. This includes 10,900 acres in wilderness study areas. The benefit to wildlife would be undeniable, yet the extent of success is unpredictable.

Streambank stabilization on Dry Fork, both the Big Salt Wash and East Salt Creek, and Blue Creek could extend fish production in up to 49 miles of stream. This would be a major extension of the public land fish resources.

Protection of the Palisade municipal watershed from surface-disturbing activities would limit surface disturbance on about 2,000 acres of critical deer winter range (less than 1 percent of total).

Impacts from Locatable Minerals, Mineral Materials, Coal and Oil and Gas Management. No significant impact on deer and elk herds would occur in the coal lease area from the direct effects of mining. However, stress on these animals would increase as a result of increased human activity. If all the leasable lands are leased, the process would be long term and the major impact to 40 percent of the big game habitat would occur beyond the 20 years of this plan. Oil and gas activity would create additional access that would allow more opportunity for poaching and harassment of deer and elk and would have the greatest adverse impact on these big game animals. Approximately 8,500 AUMs of forage would be lost to deer and elk, and some would be made up for through habitat management in other areas. These effects would prohibit the Colorado Division of Wildlife from meeting its deer and elk population goals on public land. These impacts are the same as those that would occur under the Continuation of Current Manage-

ment Alternative. In addition, oil and gas development would cause the loss of 10 miles of fish habitat and jeopardize fish habitat in 47 miles of stream. This would be due primarily to well access roads following and crossing stream routes after finding no alternate routes. The roads would remove vegetation, changing stream flows, bank stability, water temperatures, and spawning bed sedimentation. Access road construction and use would be the largest single source of wildlife disturbance, particularly during critical periods for big game and would increase the potential for poaching. It would also be the largest single cause of forage loss for wildlife.

Development of ten pending APDs in the Little Book Cliffs area would cause the removal of 78 acres of forage usable by wildlife (85 AUMs) and increase wildlife harassment (mainly wintering deer) through increasing public vehicular access by 10 miles of road over the next 20 years. The drilling of 23 projected gas wells in the Little Book Cliffs WSA would cause the loss from forage production of 176 acres (195 AUMs) and increase wildlife harassment through the addition of 23 miles of road over the next 20 years. The drilling of 33 projected gas wells in the Demaree Canyon WSA would result in a reduction of forage producing area by 249 acres (280 AUMs) and increase in harassment of wildlife along 33 miles of road over the next 20 years.

Impacts from Forest Management. Managing the timber resource to consider wildlife needs would help to improve habitat and forage production for most wildlife species. Timber rotation times would have a much greater longevity than the RMP, and the major benefit to wildlife would take many years to develop area wide.

Impacts from Wild Horse Management. Limiting herd size to a maximum of 120 horses would allow almost 10 percent of the critical deer winter range in the resource area to continue to improve as wildlife habitat.

Impacts from Cultural Resources, Recreation, and Off-Road Vehicle Management. Limiting off-road vehicle and recreation use in Rough Canyon and Cactus Park to protect cultural resources would help reduce forage loss and harassment of deer on 700 acres of deer winter range. Increasing the number and acreage of intensive recreation management areas would help provide additional protection to big game. Construction of a picnic site at Ruby Lee Reservoir would reduce waterfowl use there by 16 percent. Waterfowl resting use of the Skipper's Island area would be reduced by about 9,000 use days through the development of a roadside park by the Colorado Department of Highways. Group use designation in Cactus Park would potentially undermine the effort to increase the deer pop-

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ulation in the northern end of the Uncompahgre Plateau. As the popularity of Cactus Park increases, vehicle-based recreation would expand to a large percent of the deer winter range, preventing deer from utilizing many of the forage productive areas including Cactus Park, itself. Opening Sewemup Mesa to ORV use would allow 13,000 acres of undisturbed deer winter range to be used by snowmobiles and motor bikes. The net effect of the proposals for recreation and off-road vehicles in this alternative is a major adverse impact to wildlife.

Impacts from Special Management Areas. Designation of Baxter/Douglas Pass and Cactus Park as areas of critical environmental concerns would reduce surface disturbance and save up to 1,980 AUMs of forage for big game over a 20 year period.

Impacts from Land Tenure Adjustments. This alternative would reduce the wildlife habitat and opportunities for public use of wildlife more than would any other alternative. There would be no purchases of key wildlife parcels. Among the acres identified for disposal are critical winter range (over 1,000 acres of deer, approximately 9,000 of elk), almost 5,000 acres of high use deer spring-fall range, 2,300 acres of deer and elk summer range, 780 acres of pronghorn range, 1,000 acres of prime early fall bear habitat, 5,600 acres of wild turkey range, 200 acres of public pheasant habitat, 1,740 acres of land key for access to public land, and 2,255 acres of land which have riparian and aquatic habitat. The percent of the total in every case would be relatively small, from 10 to less than 1 percent.

Impacts from Transportation and Public Utilities Management. Acquisition of 60.5 miles of public access would improve habitat management, but would also increase harassment and poaching of big game. The latter would occur primarily along the Roan Creek-Douglas Pass loop connection. Trail access to the mouth of Pollack and of Flume canyons would increase visitor intrusions into key bighorn sheep areas. Seasonal stipulations affecting construction of public utilities on 44,140 acres during critical periods for big game, and avoiding 387 acres of critical big game range would help maintain or increase populations of big game animals.

Cumulative Impacts on Wildlife Resources

Forage production for deer and elk would be 12 percent short of meeting Colorado Division of Wildlife goals by 1988-1990. Oil and gas development would also be the largest source causing loss of forage and disturbance to big game. Recreation management would reduce waterfowl resting use at

two sites in the Grand Valley. Nondesignation of the WSAs would open these areas to the impacts from surface-disturbing activities.

Fish habitat improvement projects (where needed) on an additional 26 miles of streams with the most extensive streambank stabilization for water quality would potentially increase fish production by 50 to 200 percent. However, this would be offset by oil and gas development which would cause the loss of 10 miles of fish habitat, and jeopardize habitat in another 47 miles of stream. This would result in a net of 19 more miles in managed fish habitat and a moderate increase in fish production.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Impacts from Proposed Management Actions

Impacts from Threatened and Endangered Species Management. Impacts would be the same as those discussed under the Continuation of Current Management Alternative. Applying stipulations to all known locations and areas (sites) with a very high potential for existence of threatened and endangered species would guard against adverse impacts to threatened and endangered species, their habitat, or their ability to maintain or increase in population. Chapter 3 lists the threatened and endangered species in this resource area. Chapter 3 also provides information on the status of these species, thus indicating the significance of actions that may affect the species.

Improving 4.3 miles of Colorado River cutthroat trout habitat would help to maintain the population of this fish. Preparing three habitat management plans (HMPs) with sensitive, threatened and endangered species as key for management would provide improved habitat and potential for species reintroduction and would chart a monitoring schedule. Key management species would include the peregrine falcon, bald eagle, Colorado River squawfish, razorback sucker, and the Great Basin silver-spot butterfly (which is a nominee to the federal listed threatened and endangered species).

Cooperation with the Colorado Division of Wildlife in the peregrine falcon recovery project would increase the chances of establishing a self-sustaining population.

The Commodity Alternative would also provide suitable fish habitat to enable restocking by the Colorado Division of Wildlife and U.S. Fish and Wildlife Service of the four endangered Colorado

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River native fish species and help to create or improve fish nurseries and spawning grounds.

Impacts from Water Resource Management.

Limiting surface disturbance in the Palisade municipal watershed would help maintain riparian habitat for the Lewis' woodpecker, yellow-billed cuckoo, and prey species for peregrine falcons.

Watershed projects on Leach Creek, Hunter, Big Salt, and East Salt Washes would improve the habitat for prey species of sensitive raptors nesting along the Book Cliffs. Continuing management of the Badger Wash paired watersheds would maintain 170 acres of habitat for *Cryptantha elata* (sensitive) and the unique Gardner's saltbush/salina wildrye plant community.

These impacts would be the same as those discussed under the Continuation of Current Management Alternative. In addition, increasing the acreage of watershed improvement projects by 71,900 acres would help to increase the amount of prey available for sensitive raptor species.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Impacts would be similar to those discussed under the Continuation of Current Management Alternative, with the exception that only one site, that of the Great Basin silverspot butterfly, would be segregated from mineral sales. Maintaining existing withdrawals (primarily placer) on 36,300 acres along rivers or streams would help protect this important habitat for bald eagles. Closing 3,120 acres in Badger Wash to mineral entry would help protect *Cryptantha elata* and the Gardner's saltbush/salina wildrye plant community.

Coal unsuitability criteria would not protect sensitive plant species, in particular the musine milk-vetch.

Applying no surface occupancy, no surface disturbance, and seasonal stipulations to oil and gas development including ten applications for permit to drill (APDs) in the Little Book Cliffs area would help protect threatened and endangered species.

Impacts from Forest Management. Identifying 39,105 acres of commercial forest land as nonsuitable for management pending completion of the timber production capability classification would help to maintain habitat for raptors, notably the flammulated owl, a migratory species of high federal interest.

Impacts from Wildlife Management. As under the Continuation of Current Management Alternative, increasing forage production to help increase big game and waterfowl populations would increase the carrion food base for bald eagles, providing support for an additional 10 birds. Maintaining ponderosa pine seed trees and snags for wild turkey

would also provide habitat for the Lewis' woodpecker. However, removing formal protection for riparian vegetation could result in the loss of 10 percent of habitat for bald eagle, the great blue heron, black-crowned night heron, and the yellow-billed cuckoo.

Impacts from Cultural Resource Management.

Limiting surface-disturbing activities in Cactus Park would help to protect 80 acres containing a sparse population of spineless hedgehog cactus.

Impacts from Recreation Resource Management. Managing the Grand Valley Intensive Recreation Management Area could adversely affect habitat for the sensitive plant *Cryptantha elata* and sensitive animals such as the kit fox, Scott's oriole, and the leopard lizard. Constructing roadside stops at Ruby Lee Reservoir and Skipper's Island would reduce by over half the use of these areas by three endangered species (greater sandhill crane, whooping crane, and bald eagle). Managing nine intensive recreation management areas would help to limit potential site disturbance of threatened and endangered species by extensive recreation activities.

Impacts from Off-Road Vehicle Management.

Limiting off-road vehicle use in areas with habitat for bald eagles, peregrine falcons, and the spineless hedgehog cactus would help to protect valuable habitat and maintain populations of these species.

Impacts from Visual Resource Management.

Managing no areas as VRM Class II would increase the potential for disturbing protected species in the resource area.

Impacts from Special Areas Management.

Maintaining the Unaweeep Seep as a research natural area would protect habitat for one of the three Colorado colonies of a sensitive species of butterfly. Not designating 215 acres around Pyramid Rock as a research natural area would not protect sensitive and threatened plant species in that area. In addition, designating Skipper's Island as an area of critical environmental concern would help to protect bald eagle habitat.

Impacts from Public Utilities Management.

Designating Ruby Canyon and the Gunnison River as sensitive to public utilities development would reduce river crossings of power lines and thus decrease the potential for bald eagle mortalities caused by collisions with the power lines. The Dolores River would not have a sensitive designation. This would increase the potential for bald eagle mortalities from collisions with power lines. Designating 100 feet on each side of perennial streams as sensitive would protect almost all riparian habitat, including that of the threatened cutthroat trout.

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Cumulative Impacts on Threatened and Endangered Species

These species would be beneficially affected by the management actions that would continue under this alternative. Any adverse effects due to human use of the public land in the next 20 years would not be sufficient to jeopardize the continued existence of any species.

IMPACTS ON WILD HORSES

Impacts from Wild Horse Management

Impacts from Wild Horse Management. Managing the wild horses as outlined in the Little Book Cliffs Wild Horse Management Plan would result in the continuation of a viable herd. Seasonal closures (March 1 to June 30) of Coal Canyon to general public use and prohibiting oil and gas operators from drilling there between December 1 and May 1 would protect the herd from harassment or disturbance during critical winter and foaling periods.

Expanding the horse area to include an additional 2,380 acres would officially include the entire winter horse range within the boundaries of the horse range and legalize horse use presently occurring there.

Impacts from Water Quality Management. Sediment control measures on approximately 3,600 acres of critically-eroding soils in Jerry Gulch and Coal Canyon would potentially increase forage by 20 AUMs in the critical horse winter range.

Impacts from Coal Management. Development of existing coal leases would have a minor impact on the critical wintering and foaling areas in Coal Canyon. Identifying the remaining area as suitable pending further study and mitigating any adverse impacts from potential coal development would ensure a viable horse herd is maintained.

Impacts from Oil and Gas Management. Development of existing leases in the Little Book Cliffs area would detract from the natural character of the horse range but would not significantly impact the herd. This is because nine of the ten pending APDs (see Appendix E) are outside the horse range and the tenth pending APD and the 23 projected APDs would have seasonal stipulations placed on them as a condition of APD approval.

Placing 6,500 acres of winter range and foaling area in the Other Stipulations leasing category (see Table 2-6) would help protect the horses during winter and foaling.

Impacts from Forest Management. Limiting fuelwood sales to commercial sales of 30 acres or

less would decrease harassment. Sales would also help to increase available forage.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle (ORV) use to existing roads and trails would help to improve forage production and habitat and decrease harassment of the horse herd. Seasonal closure of Coal Canyon would protect the horses during their critical foaling period.

Impacts from Land Tenure Adjustment. Impacts are the same as those discussed under the Continuation of Current Management Alternative, except for the addition of another 150 acres of private land which is part of the critical wintering area for the horses.

Impacts from Transportation Management. Acquiring public trail access to the Hunter Canyon, Adobe, and Carpenter trails would facilitate management of the wild horses by providing more rapid access to the horse range and would provide for more human use of the area.

Cumulative Impacts on Wild Horses

Seasonal closure of Coal Canyon to general public use and to oil and gas drilling would give greater protection to the horse herd during critical winter and foaling periods. Sediment control structures in Jerry Gulch and Coal Canyon would potentially increase forage by 20 AUMs in critical horse winter range. Access acquisition to Adobe and Carpenter trails would improve management of the herd through more rapid access, and add to the recreational opportunities in the area. Adding the additional acreage to the horse area would ensure that all of the area the horses are presently using is within the horse area. Acquiring the private land within the horse area would allow a hazardous barbed wire fence to be removed and a valuable spring to be developed. Thus, a viable horse herd could be maintained.

IMPACTS ON CULTURAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Cultural Resource Management. Active management of four high value areas (Ladder Springs, Rough Canyon, Cactus Park, and Indian Creek) and prohibiting surface disturbance on ten additional sites in the Gateway area would protect sites eligible for the National Register and increase knowledge of prehistoric cultures in the resource area. Actively managing the Sinbad Valley

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historic unit would increase protection and knowledge of important historic sites. Protecting the remaining 158 known high value sites and 141 moderate value sites only to the extent required by law would result in the continued natural deterioration and vandalism of the sites.

Cultural clearances in the remainder of the area would create a larger data base than under the Continuation of Current Management Alternative and further decrease the amount of site destruction and data loss caused by surface-disturbing activities.

Impacts from Recreation Resource Management. An additional 212,000 acres designated as intensive recreation management areas would provide a greater potential for cultural resource site interpretation than under current management. Vandalism to high value sites, however, would also increase.

Impacts from Off-Road Vehicle Management. A reduction of 105,785 acres in areas where off-road vehicle use is limited to designated roads would result in increased surface disturbance, site destruction, and vandalism potential to high value cultural sites.

Impacts from Locatable Minerals, Mineral Materials, and Oil and Gas Management. The emphasis placed on development of these resources would increase vandalism and surface destruction of cultural resource sites throughout the areas affected by development.

Cumulative Impacts on Cultural Resources

The cumulative impact would be an increase in the number of potentially high value sites disturbed or destroyed and a loss of data associated with those sites. Emphasis on energy development in this alternative would make a very large contribution to the destruction and vandalism of cultural resources. Salvage mitigation for specific projects would tend to replace scientific research.

IMPACTS ON RECREATION RESOURCES

Impacts from Proposed Management Actions

Impacts from Recreation Management. Managing nine intensive recreation management areas would provide more areas for recreation and increase visitor use over that of the Continuation of Current Management Alternative (see Chapter 2, Summary of Management Actions, for description and location). Developing roadside rest stops,

public land access points, and interpretive and directional signing would also increase visitor use and convenience. Managing the Grand Valley Intensive Recreation Management Area to provide for group use and use supervision needs would reduce use conflicts in this area. The recreation management emphasis would shift recreation opportunity spectrum classes toward the urban end of the spectrum as more high profile recreation development, management, and regulations were implemented.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Increasing the area open to all types of mineral development and leasing would increase the area and amount of recreation settings being degraded in quality by these activities. Developing 10 pending and 23 projected applications for permit to drill (APDs) in the Little Book Cliffs area and 33 projected APDs in the Demaree Canyon WSA would degrade the quality of the recreation settings in those areas.

Impacts from Forest Management. Continuing fuelwood and sawtimber harvest in the resource area would result in a degradation of recreation settings.

Impacts from Wildlife Management. Reducing the area being managed under protective wildlife stipulations would also decrease the recreational opportunities for hunting and viewing. Managing 26 additional miles of stream for fish habitat and production would increase opportunities for fishing.

Impacts from Threatened and Endangered Species Management. Managing resources to protect threatened and endangered species would help to maintain the quality of recreation settings.

Impacts from Off-Road Vehicle (ORV) Management. Limiting ORVs to existing roads on 194,611 acres and closing 17,912 acres would help protect recreation settings in those areas from surface disturbance.

Impacts from Land Tenure Adjustments. Exchanging or selling public land in the Whitewater Hill, Lower Devil's, Flume, and Pollack Canyons would reduce the amount of nearby public land with convenient urban access that is available for existing recreational activities. These are moderate to heavy use areas.

Impacts from Transportation Management. Acquiring access through private land to large blocks of public land would greatly increase recreational opportunity, particularly in the Roan Creek, Book Cliffs, and Glade Park Areas.

Impacts from Public Utilities Management. Decreasing the areas classified as unsuitable by

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188,887 acres and the area with sensitive classification by 106,519 acres, would potentially reduce the quality of recreational settings in the areas affected by the change. Unsuitable and sensitive classifications would help to protect the recreational setting quality in Bang's Canyon, Black Ridge, Ruby Canyon, Granite Creek, The Palisade, Sewemup Mesa, Dominguez Canyons, Demaree Canyon, and Mount Garfield.

Impacts from Fire Management. Controlling fires in Black Ridge, Ruby Canyon, Dominguez Canyons, Sewemup Mesa, Sinbad Valley, The Palisade, Bang's Canyon, Granite Creek, South Shale Ridge, and the Gunnison and Dolores River corridors could prevent the development of natural settings important for recreational opportunities.

Cumulative Impacts on Recreation Resources

Developing recreational facilities, interpretive signing, and acquiring access through private land would help to increase opportunities. However, the reduction in areas protected by stipulation or designation would allow more extensive degradation of recreational settings and opportunities to take place than would occur under the Continuation of Current Management Alternative.

IMPACTS ON OFF-ROAD RESOURCES

Impacts from Proposed Management Actions

Impacts from Off-Road Vehicle (ORV) Management. Designating 100,000 acres in the Grand Valley and surrounding areas as suitable for competitive and intensive ORV use would help to meet increasing ORV user demands. Opening almost all of the remainder of the resource area to cross-country ORV travel would increase the opportunity for a variety of ORV use.

Impacts from Wildlife and Wild Horse Management. Seasonal closure on critical big game winter range and wild horse range would reduce ORV winter use in the Little Book Cliffs Wild Horse Range, the Beehive, and Lands End areas and protect foaling areas in the Coal Canyon portion of the Little Book Cliffs Wild Horse Range. Closure of the Coal Canyon portion of the Little Book Cliffs Wild Horse Range during the spring and early summer occurs during the highest demand period for use in that area.

Impacts from Recreation Management. Limiting ORV use to existing roads in Black Ridge, Dominguez Canyon, and Bang's Canyon, and to design-

nated roads on South Shale Ridge would reduce the opportunity for ORV cross-country travel.

Cumulative Impacts on ORV Management.

Identifying the majority of the resource area as open to ORV use would increase the variety and access for cross-country travel over that of the Continuation of Current Management Alternative. This alternative would provide the least restrictions on ORV use and the largest acreage identified for intensive and competitive ORV use.

IMPACTS ON VISUAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Visual Resource Management (VRM). Designating no areas for VRM classification would provide no protection from degradation for highly scenic visual resources.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. All mineral development, particularly coal and oil and gas, would continue to degrade visual resources.

Impacts from Forest Management. Managing for fuelwood and sawtimber production would continue to degrade visual resources in many sections of the resource area.

Impacts from Recreation Resource Management. Managing recreation resources for increased visitor use could help to maintain scenic quality in small portions of the resource area.

Impacts from Off-Road Vehicle Management. Continuing off-road vehicle use throughout the Grand Valley and, in particular, near Mount Garfield, would degrade landscape character. Adverse impacts from off-road vehicle management would be greater than those discussed under the Continuation of Current Management Alternative because 24,000 more acres were identified for intensive/competitive use.

Impacts from Public Utilities Management. Classifying Black Ridge, Ruby and Dominguez Canyons, Granite Creek, The Palisade, Sewemup Mesa, and the cliffs near Mount Garfield as sensitive to public utilities would help to minimize the impact of public utility development in these areas.

Cumulative Impacts on Visual Resources

Management actions under this alternative would provide the least protection for highly scenic visual

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resources, and degradation of these resources would continue to increase in extent and severity.

IMPACTS ON WILDERNESS RESOURCES

Impacts from Proposed Management Actions

Impacts from Wilderness Management. The impacts of recommending the seven wilderness study areas (WSAs) as unsuitable for wilderness designation would result in the loss of wilderness values including size, roadlessness, naturalness, and outstanding opportunities for primitive and unconfined recreation. Special features in many of these WSAs would also be lost. Nondesignation would prevent these WSAs, which are representative of the Colorado Plateau Province, from expanding the ecological diversity of the National Wilderness Preservation System. Their availability for recreational use as wilderness in west central Colorado would be permanently lost.

The impacts of allowing development within the WSAs following release from wilderness consideration are discussed below.

Impacts from Water Resource Management. Impacts from the 3-foot cutoff wall on Salt Creek for the Sinbad Valley salinity project would impact 15 acres on the northern edge of Sewemup Mesa WSA. Projects to control sediment yield on 3,600 acres of Coal Canyon and Jerry Gulch and 2,400 acre of Little Dominguez Creek would reduce naturalness in the areas of the projects but this could be minimized through careful selection of materials and design. A similar impact would also result from the stabilization of 3 miles of actively-eroding stream channels in Bull Draw in The Palisade WSA.

Impacts from Locatable Minerals Management. Road construction, prospecting and mine development that could result from opening up the seven WSAs to mineral entry would reduce the naturalness in these areas. Noise from these activities would lessen opportunities to experience outstanding solitude. These impacts would probably be minimal because the WSAs have been identified as having a low potential for locatable minerals.

Impacts from Coal Management. Development of existing coal leases (Demaree Canyon—222 acres and Little Book Cliffs—1,934 acres) would impair the wilderness values on two WSAs. Coal reserves do not exist on the other WSAs. Existing leases are located on the periphery of these units; therefore, the major impacts would be in Zone 1 (Figs. 4-1 and 4-2). Further coal leasing in these WSAs would create new roads, modify their natural

landscapes and diminish opportunities to experience outstanding solitude and/or primitive and unconfined recreation. Over time, both Zones 1 and 2 would probably be so impacted that they would no longer possess wilderness potential.

Following release from wilderness consideration, additional leasing and subsequent development in the Demaree Canyon and Little Book Cliffs areas would result in further loss of naturalness and opportunities to experience outstanding solitude and primitive and unconfined recreation.

Impacts from Oil and Gas Management. Development of oil and gas leases would be the most severe in the Demaree Canyon and Little Book Cliffs WSAs where the probability of development is high as evidenced by the areas being completely under oil and gas lease. BLM has estimated there will be 33 wells developed in the Demaree Canyon WSA and 31 wells developed in the Little Book Cliffs WSA over the next 20 years. The resulting surface disturbance would segment these WSAs into parcels less than 5,000 acres in size, disrupt naturalness, and minimize opportunities to experience outstanding solitude and/or primitive and unconfined recreation. Special features in the Little Book Cliffs WSA would also be impaired.

Development of ten applications for permit to drill (APDs) in the Little Book Cliffs area would have the following impacts: Two of the APDs are outside of the Little Book Cliffs WSA and would have no impact on wilderness characteristics. Development of 7 APDs in Zone 1 would directly impact about 62 acres and would eliminate this northern portion of the zone from further wilderness consideration. This would constrain Congress' ability to designate the balance of the area as wilderness. One well in Zone 2 would impact about 9 acres and would be a major impact on the unit. Any development in Zone 2 incrementally lessens this core area from being manageable as wilderness. Further well development on the pre-FLPMA leases that make up more than 90 percent of Zone 2 could make the entire WSA unsuitable for wilderness designation.

The probability for oil and gas development is low in all the remaining WSAs except for Sewemup Mesa which is moderate. The only oil and gas lease in these WSAs is in The Palisade, where a pre-FLPMA lease extends into the WSA and covers 120 acres. Overall, the impact from oil and gas would be expected to be minimal.

Impacts from Mineral Materials Management. Opening all WSAs to mineral materials sales would result in a loss of naturalness from off-road vehicle travel, road development, and surface disturbance where materials are removed. Motorized vehicles and mechanical equipment would also reduce op-

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portunities to experience outstanding solitude and primitive recreation. Disruption of natural landscapes would reduce opportunities for outstanding primitive recreation such as hiking and scenic viewing.

Impacts from Forest Management. Timber harvesting and associated road construction would result in a loss of naturalness and a reduction of opportunities to experience outstanding solitude and outstanding primitive recreation. This would occur as follows: Demaree Canyon WSA—937 acres, Little Book Cliffs WSA—6,639 acres, Black Ridge Canyons WSAs—8,172 acres, The Palisade WSA—797 acres, Dominguez Canyon WSA—9,088 acres, and Sewemup Mesa WSA—2,968 acres.

Impacts from Wildlife Management. Vegetation treatments on up to 300 acres would impact the naturalness of the Black Ridge Canyons (both units) and Dominguez Canyon WSAs. The actual location and method of treatment would vary the degree of this impact. Techniques using fire would minimize this impact. Additionally, projects to improve the sport fishery habitat in Big Dominguez Creek would have minimal impact on the Dominguez WSA but would improve the fishing thereby enhancing outstanding opportunities for primitive recreation.

Impacts from Livestock Grazing Management. The construction of a livestock trail in the Dominguez Canyon WSA would reduce the naturalness and scenic values of the area. The trail would be visible for several miles in Big Dominguez Canyon and would be located directly above a heavily used area of the canyon. Outstanding opportunities for primitive and unconfined recreation in lower Big Dominguez Canyon would also be diminished. Impacts from motorized access and use of mechanical equipment for project maintenance by grazing operators would periodically decrease outstanding opportunities for solitude in all WSAs. No impacts from range management occur on the top of Sewemup Mesa WSA because the area is closed to grazing.

Impacts from Wild Horse Management. Management of the wild horses in the Little Book Cliffs WSA would periodically decrease the outstanding opportunities for solitude. This would occur anytime mechanical equipment, especially helicopters, was used in the roundup of horses. Vehicle tracks would reduce the naturalness of the area.

Impacts from Recreation Resource Management. By not managing Black Ridge Canyons, The Palisade, Dominguez Canyon, and Sewemup Mesa areas for protection of natural and scenic values, various recreational values (geological, ecological, and cultural) could be impaired or even lost.

Impacts from recreation resource management under this alternative would decrease naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. This would result primarily from promoting all types of recreation use in all WSAs. Outstanding opportunities for solitude and primitive recreation would be diminished by the dominant "open" off-road vehicle classification in the WSAs.

Impacts from Visual Resource Management. Visual quality could be degraded in all WSAs due to a lack of visual resource management classification and management.

Impacts from Off-Road Vehicle Management. The open classification in Demaree Canyon, part of the Little Book Cliffs, The Palisade, parts of Dominguez Canyon, and part of Sewemup Mesa WSAs would impact the naturalness and outstanding opportunities for solitude and primitive and unconfined recreation. Even the limited designations in the wild horse range (6,400 acres—seasonal closure) Black Ridge Canyons (existing road and trails in both units) and Dominguez Canyon (designated roads and trails) will still promote off-road vehicle use and result in associated impacts. Only the top of Sewemup Mesa would be free of off-road vehicle impacts.

Impacts from Public Utilities Management. Management of the wild horse range portion of the Little Book Cliffs WSA, the Black Ridge Canyons WSAs, the canyons (12,000 acres) of the Dominguez Canyon WSA, and the Sewemup Mesa WSA as sensitive to utilities would help to reduce impacts on wilderness characteristics in these areas. However, utility corridors could still be located here resulting in the loss of naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Similar impacts would occur in Demaree Canyon, Little Book Cliffs (outside the wild horse range), and Dominguez Canyon (outside the canyons) which are all classified suitable for utilities. Utilities could also divide these WSAs and decrease their size. Segmented parcels less than 5,000 acres in size would generally not qualify for wilderness designation.

Impacts from Fire Management. Fire control which requires the use of mechanical equipment would impair the naturalness of any WSA in which this was necessary. Controlling fire would also prevent fire from playing its role as a natural agent of change in the WSA's natural ecosystem.

Cumulative Impacts on Wilderness Resources

The loss of the seven WSAs' potential as wilderness would result in their loss of wilderness values

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and opportunity to expand the diversity of the National Wilderness Preservation System. Nondesignation would result in a permanent loss of 241,005 acres of potential wilderness in west central Colorado. This would also result in a loss of primitive recreation opportunities on these lands. Over time, all 7 WSAs would be impacted. The more rugged canyons of Black Ridge and the top of Sewerup Mesa may be less impacted. A loss of naturalness in the WSAs would mainly come about through mineral and oil and gas development (primarily in Demaree Canyon and Little Book Cliffs WSAs), road construction, and unrestricted off-road vehicle use. These activities would also prevent opportunities to experience outstanding solitude and outstanding primitive and unconfined recreation opportunities. Surface disturbance in these WSAs will also result in a loss of geologic, ecological, cultural, and scenic values present in many of the WSAs.

IMPACTS ON SOCIAL AND ECONOMIC CONDITIONS

Impacts from Proposed Management Actions

Impacts from Water Resource Management. Projects to reduce sediment yield and salinity yield would contribute to lower water treatment costs downstream. The anticipated salinity reduction of 3,300 to 11,000 tons per year would eventually reduce salinity costs in the lower Colorado River basin by \$185,000 to \$600,000 annually. Local benefits would result from increased soil productivity and reduced facility treatment costs (e.g., less frequent removal of reservoir sedimentation). The economic benefit would be slightly offset as a result of sediment and salinity increases due to activities associated with management of other resources.

Impacts from Coal Management. The exclusion of 14,100 acres from further leasing consideration would not likely have local social or economic impact since it would not affect production levels during the life of the plan. However, because one of the areas proposed for exclusion—the Palisade watershed—is adjacent to existing leases and an operating mine, a potential expansion area would be removed. This could adversely affect the mine operators and lease holders when the currently leased resource is mined out (in 20 to 40 years) or if expansion were sought to produce a more economic unit.

Impacts from Oil and Gas Management. Stipulations placed on oil and gas leases in the Grand Junction Resource Area would not likely have measurable social or economic impacts. Most of the moderate to high potential oil and gas lands are

already leased, and new stipulations would not apply to their development. To the extent that restrictive lease terms do affect drilling operations, costs would increase, creating the potential for lower production and reduced royalty revenue to the federal government and Colorado. Any impacts would be felt more by individual lease holders than by the local oil and gas industry since the industry is more reliant on production in eastern Utah and other parts of western Colorado than upon production in the resource area.

Approval of ten pending APDs in the Little Book Cliffs area could result in annual gas sales of about \$800,000. In addition to generating \$100,000 in royalty payments, these sales would support six jobs and over \$100,000 in local income. The potential drilling of 23 more gas wells in the Little Book Cliffs WSA would result in just over twice the economic impacts created by the pending applications.

Impacts from Forest Management. The sale of 3,200 cords of fuelwood annually would help offset residential energy costs and produce about \$16,000 in federal revenue. To the extent purchases were by commercial fuelwood cutters, local employment and income would be supported.

Impacts from Wildlife Management. Efforts to increase forage available for big game would work toward reduced crop losses by owners of farms and orchards in critical winter range areas. To the extent that failure to meet Colorado Division of Wildlife forage goals means reduced populations of big game, the economic sectors dependent on hunting and nonconsumptive uses of big game would be adversely affected.

Impacts from Land Tenure Adjustments. The 41,550 acres made available for disposal are equivalent to almost 6 percent of the private land base in the resource area. This increase in the supply of land could in some instances have downward influence on the price of undeveloped land, particularly on nearby properties. The downward influence would benefit potential buyers but adversely affect landowners.

If all the tracts were sold (and not exchanged), sales revenue could be as much as \$12.5 million based on an estimated average sales price of \$300 per acre. Receipts would go primarily to the federal treasury. Local property tax revenues would increase but payments in lieu of taxes would decline.

Cumulative Impacts on Social and Economic Conditions.

The cumulative impact on the local economy would likely be beneficial but not large. Sales of public land could generate considerable federal rev-

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enue. Some individuals, particularly mineral lease holders and owners of land adjacent to public land offered for sale, could be affected by recommendations in this alternative.

IMPACTS ON TRANSPORTATION

Impacts from Proposed Management Actions

Impacts from Transportation Management. Acquiring 6.75 miles of additional public trails and 80.75 miles of additional public roads would provide greater access to public land. Acquiring this additional access would open up 51 isolated areas of public land to public use. Resource management effectiveness would be enhanced by allowing shorter, safer access to public land and resources. Some areas inaccessible during certain times of year would be accessible via new roads.

IMPACTS ON PUBLIC UTILITIES

Impacts from Proposed Management Actions

Impacts from Public Utilities Management. Classifying public land as suitable (766,385 acres), sensitive (511,443 acres), and unsuitable (2,232 acres) would provide utility companies with information with which to plan and design utility projects. This would save both the utility companies and the BLM time and money by not having to redesign projects. However, compared with the Continuation of Current Management Alternative, approximately 107,399 fewer acres would be placed in the sensitive category. And the acreage suitable for public utilities would increase by 296,286 acres. Most of the increase in suitable acreage (225,320 acres) would result from not applying seasonal stipulations to prevent project construction during winter months on deer and elk critical winter range (Table 2-23, Chapter 2). This would result in a slight beneficial impact on the public utility companies in that they could construct during any time of the year.

PROTECTION ALTERNATIVE IMPACTS

IMPACTS ON AIR QUALITY

Impacts from Proposed Management Actions

Short-term localized impacts on air quality would result from vegetation manipulation practices. These impacts would be small in scale and dispersed throughout the resource area. These factors combined with required management stipulations for vegetation manipulations would reduce the significance of the impacts. Limiting off-road vehicle use through closures or restrictions would decrease soil erosion and fugitive dust emissions. Dust suppression control devices would be impractical.

Cumulative Impacts on Air Quality

Increased levels of air pollution are anticipated from regional growth and energy minerals development. Emissions from primary sources would be minimized through applicable policies, regulations, and statutes.

IMPACTS ON SOILS

Impacts from Proposed Management Actions

Implementation of erosion and sediment control measures on 164,700 acres presently classified as critical or severe erosion areas would help to increase vegetation production in these areas and reduce sediment yield by up to 2 tons per acre treated per year. The amount would depend on soil type, slope, and the extent of exposed geologic parent materials (primarily weathered shales and sandstone) capable of supporting only a very sparse vegetative cover. Approximately 1,500 acres of critically-eroding soils in Cactus Park would be treated to reduce sediment yield and gully erosion.

Decreasing the acreage open to leasing with only standard stipulations and closing an additional 132,555 acres to leasing would slightly reduce the amount of erosion and sediment yield compared to that occurring under the Continuation of Current Management Alternative. A relatively large increase in acreage closed to locatable and salable mineral development would potentially reduce soil erosion and sediment yield from these areas by 0.1 to 0.5 ton per acre per year. Designating 18,000 acres of high soil slump hazard as an area of critical envi-

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Environmental concern would have the same impact as under the Continuation of Current Management Alternative. Surface disturbance or occupancy on 860 acres in the Plateau Creek area would increase the extent and amount of soil erosion and increase the hazard to property.

Designating 252,555 acres as wilderness would help to reduce or eliminate the amount of surface disturbance from forestry, mineral-related and off-road vehicle activities. This would decrease soil erosion and compaction, thereby helping to maintain or improve soil productivity in areas currently or potentially affected by surface disturbing activities.

Surface disturbance and soil erosion caused by off-road vehicle use would decrease because of the larger acreage closed to such use or limited to existing or designated roads and trails. As vegetative cover reestablishes itself on previously disturbed areas, soil erosion and sediment production in these areas would continue to decrease.

Development of ten pending applications for permit to drill (APDs) in the Little Book Cliffs area would increase soil erosion and sediment yield until well sites and access roads were reclaimed. Drilling 23 projected wells in the Little Book Cliffs Wilderness Study Area would further increase soil erosion and sediment yield. Development of 33 new wells in the Demaree Canyon WSA would also increase short-term soil erosion until successful reclamation took place. In addition, a number of well sites could potentially be located on soils having an extremely high probability of slumping when cuts are made in the sideslopes. Loss of the well pad site and access road could occur, along with extensive slumping and soil erosion in the adjacent area. The No Surface Occupancy stipulation would reduce or eliminate these impacts on the pre-FLPMA leases.

Cumulative Impacts on Soils

Cumulative impacts on soil erosion and sediment yield under this alternative would show the greatest reduction in quantity because fewer areas are affected by surface-disturbing activities.

IMPACTS ON WATER RESOURCES

Impacts from Proposed Resource Management Actions

Impacts from Water Resources Management. Watershed treatments on 194,000 acres of saline and critically-eroding soils would reduce sediment yield from selected areas by 1 to 6 tons per acre per year. These treatments also would reduce total

salt yield from the resource area by 2,500 to 10,000 tons annually. Treating 58 miles of actively-eroding stream channels would reduce channel erosion by 25 to 35 percent.

Maintaining the check and retention dams in Indian Wash and Leach Creek (spread over approximately 6,000 acres) would provide water quality and flood control benefits. An estimated 15,000 to 20,000 tons of sediment and 800 to 1,000 tons of salt would be prevented from entering the Colorado River annually which would improve water quality. Flood control benefits to Grand Junction would continue.

Building additional sediment control structures in Leach Creek (spread over approximately 600 acres) would prevent another 1,200 to 3,000 tons of sediment and 100 to 125 tons of salt from entering the Colorado River. Additional minor flood control benefits would be provided to Grand Junction.

Permitting only limited surface disturbance in the Palisade municipal watershed would help to protect that town's drinking water supplies. Similarly, the No Surface Occupancy stipulation on oil and gas development on the BLM portion of the Grand Junction municipal watershed would help protect Grand Junction's water supplies.

Management of Badger Wash as a hydrologic study area (685 acres) would enable the BLM to control oil and gas development in Badger Wash. This would provide the BLM an opportunity to study the impacts of this development on sediment and salinity yield on the Mancos shale.

Restricting development within wetlands and 100-year flood plains would help protect important wildlife habitat and afford continued flood protection benefits to downstream communities.

Limiting off-road vehicles to existing roads outside designated group use areas would reduce sediment and salinity production. In Indian Wash for example, limitations would help reduce sediment yield by up to 3 tons per acre per year and salt yield by 200 tons per year.

Prohibiting coal leasing under approximately 4,100 acres of the Colorado River within the coal area would protect the river from diminishing flow (draining into mine workings through subsidence cracks) and possible water quality degradation from coal development.

Restricting development within wetlands and 100-year flood plains would provide important wildlife and flood protection benefits associated with wetlands and flood plains.

Impacts from Locatable Mineral Management. By withdrawing an additional 373,000 acres of land

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from mineral entry, the potential for water quality degradation from mining activities would be substantially reduced. The impacts include increased sediment from roads and other mine-related facility construction and heavy metal contamination from spoil pile runoff. These impacts are not quantifiable without site-specific information.

Impacts from Coal Management. The impacts of identifying 223,137 acres as acceptable for further coal leasing consideration would be similar to those discussed under the Continuation of Current Management Alternative. However, based on multiple use tradeoff decisions (Appendix D, Table D-3), 102,831 fewer acres would be subject to water quality impacts under this alternative. Mining activities would increase sediment and possible salinity yield to streams from construction of associated mine roads and surface facilities. Potential water quality degradation may result from spoil pile runoff. Underground mining could disrupt ground water systems causing changes in quantity and quality of ground water. Mitigation would be imposed to minimize most of these impacts.

Eliminating 102,831 acres from further coal leasing consideration would prevent water quality or flow impacts associated with mining activities from occurring. If mining was allowed under the Colorado River or within the Palisade municipal watershed, subsidence cracks could result. These could allow part or all of the stream flow to enter the mining zone. The municipal supply and flow in the Colorado River could thereby be lost or reduced. Not leasing these areas will prevent these impacts from occurring.

Allowing coal leases to develop within the lower portion of the Palisade municipal watershed would not significantly impact Palisade's water supplies. This portion of the watershed is mainly used for water transmission facilities. Cabin Reservoir also partly overlies this lease. By not mining directly under the streams or reservoirs, no impacts on the reservoirs or streams from subsidence should occur. Any impacts to the transmission facilities could quickly be remedied by the coal company responsible. Any site-specific impacts of developing this lease would be addressed when a mine plan was submitted.

Impacts from Oil and Gas Management. Development of the ten pending APDs in the Little Book Cliffs area and the projected 23 APDs in the Little Book Cliffs Wilderness Study Area would disturb an estimated 235 acres for road, drill pad, and pipeline construction. This surface disturbance would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Further water quality impacts could occur from reserve pit leakage causing increased levels of total dissolved

solids and heavy metals in receiving waters. Potential sediment impacts occurring from approximately 120 acres would decrease to near predevelopment levels following successful rehabilitation. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Developing 33 projected new wells in Demaree Canyon Wilderness Study Area would disturb approximately 250 acres for road, drill pad, and pipeline construction. These construction activities would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Additional water quality impacts could occur from reserve pit leakage causing elevated total dissolved solid and heavy metal levels in receiving waters. Potential sediment impacts occurring from approximately 125 acres would decrease to predevelopment levels as the area was rehabilitated. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Impacts from Mineral Materials Management. Closing an additional 514,968 acres to mineral material sales and free use permits would decrease by a like amount the area subject to water quality impacts. Impacts from mineral material sales would include localized short-term water quality degradation from sediment. Proper mitigation could minimize impacts, however.

Impacts from Forest Management. Removing an additional 20,000 acres of pinyon-juniper woodlands from the suitable forest management base would decrease the area subject to water quality impacts by 20 percent. Additionally, leaving 200-foot buffer strips along perennial streams would help to prevent sediment yield from reaching the stream. This would minimize sediment levels in streams. The magnitude of these effects cannot be quantified without site-specific information but should be significant.

Impacts from Wildlife Management. Proposed vegetation manipulations would cause a short term increase in sediment yield until the vegetation reestablished. Protection of riparian habitat, fisheries, and critical ranges would help limit surface disturbance, thus keeping sediment yield down.

Impacts from Recreation Resource Management. Redirecting and increasing use of public lands for recreation would increase water quality problems associated with human use. Human use, through increased surface disturbance, increases sediment and salinity yield. The use patterns established by this alternative would determine the ef-

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fects on water resources. Heavy use areas would experience increased sediment yields. Biological contamination could also occur.

Impacts from Visual Resource Management. Management would have some secondary benefits to water quality by restricting development. Managing Sinbad Valley as a Class II area might interfere with the proposed Sinbad Valley Salinity Control Project. The evaporation pond alternative for salinity control in Sinbad Valley might not be compatible with a Class II VRM area.

Impacts from Off-Road Vehicle Management. The net effect of the greatly increased restrictions on vehicle use (closures and limitations) would be to improve water quality. Sediment yield would decrease in many areas because of off-road vehicle use limitations. The magnitude of these effects is not readily quantifiable but would be a very positive benefit.

Impacts from Wilderness Management. Recommending all seven wilderness study areas as suitable for wilderness would benefit water resources by preventing potential surface disturbances from development. However, allowing pre-FLPMA oil and gas and coal leases to develop in the Little Book Cliffs WSA and in Demaree Canyon WSA would degrade water quality. Sedimentation would increase from the construction of associated facilities. The magnitude of these effects is not quantifiable. It would depend on what development is taking place presently and what would likely happen in the future without wilderness designation.

Impacts from Special Management Areas. Designation of areas as areas of critical environmental concern or natural areas would limit surface disturbances, thus limiting the potential to impact water resources. However, designation of South Shale Ridge as an area of critical environmental concern would not allow any watershed rehabilitation work to be done on the 11,000 acres of critically-eroding soils there.

Impacts from Land Tenure Adjustments. Disposal of a few small parcels with riparian habitat or within 100-year flood plains would have potential adverse consequences. Values of these areas including flood prevention, wildlife habitat, etc., could be lost.

Impacts from Transportation Management. Increased vehicle travel associated with new public access would slightly increase sediment yield (less than 10 percent). In those areas where new roads would be built, sediment yield would increase much more. The magnitude of this increase would be dependent on the roads' location and design. The cu-

mulative effect of these proposals on water resources would generally be low.

Impacts from Public Utilities Management. The acreage unsuitable or sensitive under this alternative is much greater than under the Continuation of Current Management Alternative. Theoretically, this would limit increases in sediment yield from public land due to public utility construction. However, since many of the unsuitable or sensitive designations are based on land use decision and not environmental concerns, the real effect on water resources cannot be determined without site-specific information.

Impacts from Fire Management. The effects of fire management on water resources are very difficult to predict or quantify on a resource area-wide basis because of the tradeoffs involved between positive and negative, long-term and short-term effects of fire. Site-specific information would be necessary to predict and quantify exact effects.

Fires, whether natural or man-caused, destroy much of the vegetative cover. This, in turn, causes short-term water quality problems because of increases in nutrients and sediment entering the streams. As the vegetation reestablishes, these increased sediments and nutrients decline to, or below, preburn levels. Suppression of fires helps keep down the short-term increases in sediment and nutrients, but may not allow the long-term decreases in sediment yield related to increased vegetative cover often resulting after fires.

This relationship may not hold for areas with steep slopes, poor vegetative productivity, or poor or highly-erosive soils. These areas are often very slow to recover and, thus, fires should be suppressed quickly. Site-specific information would be necessary to predict and quantify exact effects.

Suppression activities would also contribute to short-term quality problems. Surface disturbance caused by construction of fire access roads, fire lines, fire breaks, etc., would compound the sediment yield increases caused by the fire. Also, any fire retardant used could eventually be washed into streams, causing a short-term decline in water quality.

The effects of establishing fire dependent ecosystems in specific areas would be extended over 50 percent more area than under the Continuation of Current Management Alternative.

Cumulative Impacts on Water Resources

Under this alternative, proposed management actions would decrease sediment and salinity yield into the Colorado River. The exact magnitude of

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this decrease is unquantifiable at this time. The magnitude would depend on the reductions in sediment and salinity that watershed rehabilitation treatments would accomplish on the 194,000 acres of the resource area yielding high levels of salt or sediment available for treatment. This would not be known until area specific activity plans were developed.

Slightly offsetting these decreases would be some additional sediment and salt yields from increased development. Most of these effects would come from roads and other surface disturbances resulting from increases in oil and gas, forestry, and off-road vehicle activities (increased due to increasing population, not management). Under this alternative, more control over these activities would be used through limitations and formal designation of areas for particular purposes. This would allow the BLM to limit the increases in sediment yields somewhat.

IMPACTS ON LOCATABLE MINERALS

Impacts from Proposed Management Actions

Impacts from Locatable Minerals Management. Identifying 893,329 acres as open would make this acreage open to location under the general mining laws. Compared with the Continuation of Current Management Alternative, 373,219 fewer acres would be open to location.

Continuing withdrawals on 124,843 acres and withdrawing an additional 441,219 acres in various locations would eliminate a total of 566,062 acres from location. The withdrawn areas have low economic development potential.

IMPACTS ON COAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Coal Management. Identifying 223,137 acres of public minerals as acceptable for further coal leasing consideration (Table 2-4) would make an estimated 2,486.3 million short tons of in place (measured, indicated and inferred) coal available for leasing. The reserve estimates are based on information from Schwochow (1978) and Hornbaker, et al (1976). This is a decrease of 102,831 acres and 1,429.7 million short tons in place compared with the Continuation of Current Management Alternative.

Impacts from Coal Unsuitability Recommendations. The impacts of identifying 14,100 acres

and 185.5 million short tons in place as unsuitable for further coal leasing consideration are discussed under the Continuation of Current Management Alternative. The impact would be low.

Impacts from Multiple Use Tradeoff Recommendations. The impacts of identifying 127,252 acres as unacceptable for further leasing would range from low to high. The impact would depend on the area excluded, the amount of accessible coal and other factors. In the South Shale Ridge area (22,500 acres and 296.1 million short tons in place), the impact would be low because the coal in that area is more than 2,000 feet deep and would therefore be difficult to mine.

In the Hunter/Garvey Canyons Intensive Recreation Management Area (19,000 acres and 250 million short tons in place), the impact would be moderate. The area is between two groups of leases. Making the area unavailable for leasing would prevent lease holders from expanding their operations into this area or allowing new leases to be developed.

In the Baxter/Douglas Pass area (18,000 acres and 236.9 million short tons in place), the impact would be moderate to high because of existing adjacent leases. Should the areas surrounding the soils sites be available for leasing, the configuration of the soils sites would possibly make development of those areas difficult.

In the Mount Garfield/Grand Mesa area (9,520 acres and 125.3 million short tons in place), the impact would be high because of industry interest in leasing, adjacent leases that would be unable to expand into this area, and coal that would be bypassed should those leases be developed.

In the Little Book Cliffs and Demaree Canyon Wilderness Study Areas (49,086 acres and 645.9 million short tons in place), the impact would be high. Both areas have leases within their boundaries; and leases could not be expanded. Coal companies have expressed interest in leasing within the Little Book Cliffs Wilderness Study Area.

In the Little Book Cliffs Wild Horse Range outside the Little Book Cliffs Wilderness Study Area, the impact would be high. An estimated 120 million short tons of coal would be unavailable for further leasing. Existing leases could not be expanded into the area, and existing facilities could be used to mine the area. Coal companies have also expressed interest in additional leasing.

Impacts from Oil and Gas Management. The impacts of leasing and subsequent development of oil and gas in the same areas identified as acceptable for further coal leasing consideration (223,137

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acres) are discussed in the Continuation of Current Management Alternative.

Leasing and subsequent development of oil and gas in the same areas identified as acceptable for further coal leasing consideration (223,137 acres) could reduce considerably the amount of coal available for mining. The amount of coal unavailable for mining would depend on various unknown factors, such as the scope and timing of development of both resources, and the amount of coal required to be left as pillars around existing oil and gas wells. No projections on coal loss around oil and gas wells have been made for coal leasing areas. However, a conflict could exist between coal and oil and gas if sufficient amounts of coal were required to be left in place so as to make the area uneconomical to mine. Any conflict will be resolved prior to coal leasing.

Developing 10 pending and 23 projected applications for permit to drill (APDs) in the Little Book Cliffs area would result in the following impacts: One of the pending APDs would have no impact on coal development because it is located outside the area found acceptable for further coal leasing consideration under this alternative. Nine of the pending APDs are located inside the area found acceptable for further coal leasing consideration. These nine APDs and the 23 projected APDs would conflict with future coal leasing and development because a pillar of coal would have to be left around each producing well during simultaneous development of coal and oil and gas. The amount of coal left around each well would vary considerably depending upon the method of calculation. The Bureau of Mines requires a 150-foot-radius (300-foot-square pillar) of coal left around each producing well. For each producing well this would result in an average coal loss of 29,000 tons of in-place coal, or 261,000 tons of in-place coal for the 23 projected wells for a total loss of 928,000 tons of

in-place coal. This loss would be minor. The Colorado Mined Land and Reclamation Board might require using a 21 degree angle of draw from the coal bed to the surface. Using this method, each producing well would result in an average loss of in-place coal of 480,000 tons per well, or 4,320,000 tons for the nine pending APDs and 11,040,000 tons for the 23 projected wells, for a total loss of in-place coal of 15,360,000 tons. This would be a high impact and might result in the area being uneconomical to mine.

Developing 33 projected wells in the Demaree Canyon WSA would result in the following impacts: Leaving coal around producing wells as required by the Bureau of Mines could result in the loss of 57,000 tons of in-place coal. Using the possible requirements of the Colorado Mined Land and Reclamation Board method would result in a high impact that might result in the area being uneconomical to mine.

Cumulative Impacts on Coal

Identifying 14,100 acres as unsuitable based on coal unsuitability and 127,252 acres as unacceptable based on multiple use tradeoffs would eliminate a total of 141,352 acres and an estimated total tonnage of 1,860 million short tons of in-place coal from further leasing consideration.

IMPACTS ON OIL AND GAS

Impacts from Proposed Management Actions

Impacts from Oil and Gas Management. Table 4-3 lists the development potential within each leasing category.

Table 4-3 Development Potential by Leasing Categories

Lease Category	Oil and Gas Development Potential (Acres)			
	High	Moderate	Low	Total
No Leasing	53,100	29,140	171,315	252,555
Leasing with Stipulations:				
No Surface Occupancy	166,173	50,283	90,588	307,044
Other Stipulations	337,350	52,759	38,088	428,197
Standard Lease Terms				471,595

Note: Table 2-6, Chapter 2, identifies oil and gas leasing restrictions by resource concerns and by alternative.

Making approximately 471,595 acres available for lease with standard lease terms only would allow

exploration and development with few restrictions. Compared with the Continuation of Current Man-

Protection Alternative Impacts

agement Alternative, approximately 136,268 fewer acres (22 percent decrease) would be available for lease with standard lease terms.

Closure of approximately 53,100 acres with high development potential to leasing would result in lost rental and royalty revenues and foregoing of potential reserves. Closure of about 29,140 acres with moderate development potential would result in lost rental revenues and foregoing of resources; however, it is much less likely that development activities would occur on these lands than on high potential lands. Closure of approximately 171,315 acres with low development potential may result in loss of rental income; however, it is unlikely that these lands would be applied for leasing or that any development would occur as the areas are not considered to be prospectively valuable for oil and gas. Compared with the Continuation of Current Management Alternative, an additional 140,717 acres (126 percent increase) would be closed to leasing. Of this acreage, approximately 22,979 acres have high development potential, 17,785 acres have moderate potential, and 100,953 acres have low potential.

Making approximately 166,173 acres with high development potential and 50,283 acres with moderate development potential available for lease with the no surface occupancy (NSO) stipulation would result in higher drilling and development costs, as directional drilling would be necessary. High drilling and development costs might result in limited activity and foregoing of some oil and gas reserves. Making approximately 90,588 acres with low development potential available for lease with the NSO stipulation would have little effect, as it is unlikely that any development would occur on these lands. Compared with the Continuation of Current Management Alternative, approximately 263,605 additional acres (606 percent increase) would be subject to the NSO stipulation. Of this acreage, approximately 145,038 acres have high development potential, 36,546 acres have moderate potential, and 82,021 acres have low potential.

Making approximately 337,350 acres of high and 52,759 acres of moderate development potential lands available for leasing with other stipulations might result in some higher costs and scheduling inconveniences for development projects but would probably not result in foregoing oil and gas reserves. Making approximately 38,088 acres with low development potential available for lease with other stipulations would probably not affect development, as it is unlikely that such projects would occur. Compared with the Continuation of Current Management Alternative, 11,135 fewer acres (3 percent decrease) would be subject to other stipulations. Of this acreage, approximately 33,796 more acres have high development potential, 19,529

more acres have moderate potential, and 3,132 more acres have low potential.

Impacts from Coal Management. Mining of coal might result in delays in drilling schedules, higher drilling and development costs, and the use of special techniques or alternate drill sites. Mining might also damage existing wells. If the potential gas producing zone were a minable coal bed, mining might remove or reduce the gas resource. However, because of the greatly reduced acreage available for leasing under this alternative (compared with the Continuation of Current Management Alternative), the loss of the gas resource would not be significant.

IMPACTS ON MINERAL MATERIALS

Impacts from Proposed Management Actions

Impacts from Mineral Materials Management. Identifying 840,597 acres as open would make that acreage available for mineral material sale and free use permits. This would allow companies and individuals to submit applications for removal of mineral materials on 58 percent of the resource area.

Continuing to close 6,188 acres and closing an additional 612,606 acres would eliminate a total of 618,794 acres from consideration. Compared with the Continuation of Current Management Alternative, an additional 514,968 acres would be closed. This would be a significant impact because of the large amount of land involved. Specific areas where the closures would be significant are the Palisade municipal watershed, some riparian areas, and the Gunnison Gravels area. All of these areas have high development potential or contain minerals not readily available elsewhere.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Paleontological Resource Management. Impacts from paleontological resource management would be the same as discussed under the Continuation of Current Management Alternative, with the exception of designating the Rabbit Valley site (280 acres) and the Fruita Paleontological Site (280 acres) as research natural areas (RNAs). RNA designation would provide the greatest degree of protection for the fossil values.

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Impacts from Oil and Gas, Mineral Materials, and Public Utilities Management. Designating the Rabbit Valley paleontological site as sensitive to oil and gas activities and no surface occupancy on the Fruita Paleontological Site would aid in decreasing the chances of fossil destruction, as would elimination of public utilities from both areas. Closing these sites to mineral material removal would also provide a high degree of protection to fossil resources.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle use at the Rabbit Valley site to designated roads and trails would decrease somewhat the amount of potential fossil destruction compared to that occurring in the Continuation of Current Management. The Fruita site would remain closed to off-road vehicle use.

Impacts from Wilderness Management. Although wilderness designation offers protection to fossil values by preventing surface-disturbing activities, many times fossils are found through surveys prior to surface activities or during field work. Wilderness designation would prevent this in the 7 wilderness study areas. Also, when fossils are found within the wilderness areas, stipulations to protect wilderness values would preclude quarries and make transport of large fossils difficult.

Cumulative Impacts on Paleontological Resources

The greatest protection for fossil resources in the Rabbit Valley and Fruita sites would come through RNA designation under this alternative. Wilderness designation would also provide protection of sites in the WSAs, but this designation would also prevent thorough surveys prior to surface-disturbing activities.

IMPACTS ON FORESTRY

Impacts from Proposed Management Actions

Impacts from Forest Management. Management of 20,384 fewer acres of productive pinyon-juniper woodland (88,666 acres total) would decrease the annual harvest of fuelwood by 15 percent or 400 cords.

Silvicultural practices that include clearcutting, shelterwood and selective cutting, and commercial thinning would help to maintain the health and increase productivity of the forest resource. Overmature stands would be harvested and allowed to naturally reforest with younger, more vigorous trees.

Impacts from Locatable Minerals and Oil and Gas Management. Locatable minerals develop-

ment could significantly impact the forest resource in areas where they overlap. Uranium mining could reduce the amount of pinyon-juniper under management by as much as 25 percent in some areas. Much of this loss would begin to be recovered in 25 to 35 years. Oil and gas development could provide better access into many areas on the Book Cliffs.

Oil and gas activity could cause the annual loss of 70 acres of forest land. This land would be out of production for up to 60 years for a producing well and 30 years for a dry hole. The ten pending APDs in the Little Book Cliffs area, the 23 projected wells in the Little Book Cliffs Wilderness Study Area, and the 33 projected wells in Demaree Canyon Wilderness Study Area are included in this acreage. This development would result in no significant impacts.

Impacts from Wildlife Management. Designing fuelwood and timber sales to meet wildlife needs for edge and cover in the Book Cliffs would have no significant impact on harvest levels. Stipulations would protect elk calving sites from disturbance in the Baxter/Douglas Pass area on 400 acres of commercial forest land.

Impacts from Livestock Grazing. Maintenance of the existing chainings (done in the 1960s) would result in the permanent loss of approximately 9,000 acres of productive pinyon-juniper woodland, with a large percentage of this area having some of the highest production potential in the resource area.

Impacts from Wild Horse Management. Limiting sales in the Little Book Cliffs Wild Horse Range to commercial sales of no more than 30 acres would have no significant impact on meeting public demand at the present time. When fuelwood demand exceeds the supply capability of areas outside the wild horse range, however, this restriction could have a significant impact.

Impacts from Recreation Management. Designation of Bang's Canyon as an intensive recreation management area would result in the loss of 12,451 acres of productive pinyon-juniper woodland and 949 acres of commercial forest land, primarily ponderosa pine. Managing the Hunter/Garvey, Granite Creek, and Sinbad Valley areas as intensive recreation management areas would result in higher logging costs and lower volumes per acre. The cumulative impacts of these actions would be significant.

Impacts from Wilderness Management. Designation of all seven wilderness study areas as wilderness areas would result in the permanent loss of 29,335 acres of productive pinyon-juniper woodland and 545 acres of commercial forest land. This would be a significant impact.

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Impacts from Land Tenure Adjustments. Acquiring 400 acres of productive pinyon-juniper woodland in the Indian Park area would increase potential fuelwood harvests in that area.

Impacts from Transportation Management. The Town of Palisade's exclusive easements to the town of Palisade for use of the Rapid and Cottonwood Creek roads in the Palisade municipal watershed would close the use of these roads for the removal of timber from 402 acres of commercial forest land and from 805 acres of productive pinyon-juniper woodland.

Cumulative Impacts on Forestry

Multiple use restrictions would prohibit any type of intensive management on approximately 46,018 acres of productive pinyon-juniper woodlands, 34 percent of the woodland base. Intensive management on the remainder of the pinyon-juniper woodlands would improve the health and vigor of the stands.

IMPACTS ON WILDLIFE

Impacts from Proposed Management Actions

Impacts from Wildlife and Fish Habitat Management. Joint development of habitat management plans with the Colorado Division of Wildlife would assist each agency in meeting forage production and big game population objectives. Managing 34 percent of the resource area for deer and elk as key species would promote an increase in forage production and use by up to 24 percent through vegetation manipulation and water development projects. Site-specific impacts from increasing forage production by the various methods listed in Appendix B would be analyzed in the habitat management plans. Seasonal stipulations prohibiting disturbing activities during critical periods would reduce stress and would help deer and elk to attain Colorado Division of Wildlife population goals. Protection of elk calving sites would also help to meet those objectives.

Providing habitat for the reintroduced bighorn sheep in the Black Ridge and Dominguez areas would result in two herds of approximately 100 animals each by 1990. They would be protected from disturbance during critical periods on 2,560 acres of bighorn sheep range outside areas recommended for wilderness management. Wild turkey, pronghorn antelope, chukar, sage grouse, and sharp-tailed grouse would achieve stable or huntable populations through habitat management/improvement and water development.

Measures to protect riparian habitat would limit its loss to 3 percent of the total during the next 20 years. Riparian habitat improvements would restore native understory grasses and shrubs, decreasing fire susceptibility and increasing wildlife carrying capacity. Establishing a 30 to 60-acre wetland area would provide habitat for migrating water birds during periods when management of other water areas conflicts with the needs of waterfowl, shore and marsh birds.

Stream improvement projects (where needed) along 71 miles of streams would help to maintain or improve fish habitat. Since the fish potential on public land streams is not large compared to the potential on streams of forest and private land, this impact would be modest. Stipulations protecting riparian vegetation on all perennial streams would reduce loss of this habitat and increase the amount in fair and good condition to 75 percent of the total (approximately 2,500 acres).

Impacts from Threatened and Endangered Species Management. Limiting surface-disturbing activities to protect wintering bald eagles along the Colorado River below Fruita would also decrease harassment and poaching of the resident deer population during winter months and would help to maintain the herd, which represents two percent of the total population in the resource area.

Impacts from Water Quality Management. Impacts would include those discussed under the Continuation of Current Management Alternative. Protection of the Palisade municipal watershed would limit disturbance of about 600 deer on 2,000 acres of critical winter range. Construction of retention dams on Leach Creek would provide up to 200 additional acres of important waterfowl resting areas (spring and fall), expanding the area with public access which would be the significant impact. Stream habitat improvement projects along Big and Little Dominguez Creeks would increase fish productivity by 30 pounds per acre. The Protection Alternative would also have the following additions: Watershed treatments on 61,000 acres would increase forage production and extend the waterfowl feeding and resting area. Sediment control structures on Calamity and Blue Creeks would enable fish production on these creeks (a minimum increase in production of 25 percent during the first 15 years). Stream stabilization and improvement projects in Big and East Salt Creeks would extend fisheries potential and increase production in Dominguez Creek by 30 pounds per acre.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Resources Management. Wilderness designations, areas closed to leasing or development, and protective stipulations would enable the greatest reduction in adverse im-

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pacts on wildlife, wildlife habitat, forage production, riparian vegetation, and stream fish habitat. The benefit to fish and wildlife has not been quantified.

Development of ten pending APDs in the Little Book Cliffs area would cause the removal of 78 acres of forage usable by wildlife (85 AUMs) and increase wildlife harassment (mainly wintering deer) through increasing public vehicular access by 10 miles of road over the next 20 years. The drilling of 23 projected gas wells in the Little Book Cliffs WSA would cause the loss from forage production of 176 acres (195 AUMs) and increase wildlife harassment through the addition of 23 miles of road over the next 20 years. The drilling of 33 projected gas wells in the Demaree Canyon WSA would result in a reduction of forage producing area by 249 acres (280 AUMs) and increase in harassment of wildlife along 33 miles of road over the next 20 years.

Impacts from Forest Management. Harvest of pinyon-juniper woodland products would not be allowed on nearly 46,000 acres of mature, productive woodland and would provide for the maximum amount of big game cover. This would, however, mean loss of the opportunity to increase forage on big game winter range through planned wood harvest. Mature and old growth woodland wildlife species would have the largest amount of productive habitat (deep soil, not on steep ground) under this alternative. Selective harvest in the Hunter/Garvey Canyons and Granite Creek areas would also assure retention of mature and old growth woodland at these locations. Wood sales would be designed to benefit wildlife habitat, yet the major benefit to wildlife is long term; i.e., beyond 20 years.

Impacts from Wild Horse Management. Limiting herd size to a maximum of 120 horses would allow about 10 percent of the deer critical winter range within the resource area to continue to improve as wildlife habitat.

Impacts from Recreation and Off-Road Vehicle Management. Increasing the number and acreage of intensive recreation management areas would reduce harassment of big game on 30,000 acres of critical winter range. Designating 14,700 acres north of Collbran as a quality hunting area would maintain a high level of elk use in that area. The large reduction in areas open to unrestricted off-road vehicle use would decrease big game harassment by 20 percent. Closing Skipper's Island and Unaweep Seep to vehicle use would protect riparian habitat from being lost. Skipper's Island has strong local support groups, and Unaweep Seep has state and national significance.

Impacts from Wilderness Management. Wilderness designations would allow natural changes in species diversity and population levels to occur for both game and nongame animals. Vegetation ma-

nipulation projects to increase big game forage production on up to 600 acres could be determined to be unfeasible to modify to meet wilderness management needs, with a potential loss of 667 AUMs over 20 years. Water developments to allow better distribution of wildlife and forage utilization might be reduced. The losses from foregone habitat improvement opportunities are likely to be more than offset by the provision of relatively large undisturbed habitat which will become a distinct shortage in the long term of the resource area (see also Appendix I). Fish habitat on 26 miles of Big and Little Dominguez Creeks would not be developed. However, prohibiting surface disturbance along these streams would protect available fish habitat and riparian vegetation.

Impacts from Special Management Areas. Designation of Baxter/Douglas Pass and Cactus Park as areas of critical environmental concern (ACECs) would enable production of an additional 2,050 AUMs of forage for wildlife over the next 20 years. The South Shale Ridge ACEC would protect 10,000 acres of critical deer migration corridor and some winter range from surface disturbance. Riparian habitat would be protected under the Skipper's Island ACEC and Unaweep Seep Research Natural Area.

Impacts from Land Tenure Adjustments. Acquiring 1,050 acres in Little Dominguez, East Salt Creek, Skipper's Island, Horsethief Canyon, and Unaweep Seep would add to and protect the riparian habitat in these areas. Obtaining 1,560 acres in Devil's and Flume Canyons would secure key access to bighorn sheep range. Of the lands identified for disposal, 800 acres would be in deer and elk critical winter range, 240 acres would be in deer and elk summer range, and approximately 900 acres would be in parcels having riparian and aquatic habitat. The impacts would be small.

Impacts from Transportation and Public Utilities Management. The De Beque-Douglas Pass loop would increase poaching losses of big game by an estimated 60 animals each year. The improved road access to big game range in the resource area would increase harassment and poaching. Seasonal road closures, however, would help to eliminate much of the adverse impacts. The possible closing of 170 miles of existing road, 430 miles of roads to dry wells, and 50 miles of road where road density exceeds two miles per square mile would greatly reduce harassment and poaching of big game and improve the ability to manage habitat. An increase of 92 percent in areas designated unsuitable for public utilities would prevent forage loss and reduce potential big game harassment in those areas.

Protection Alternative Impacts

Cumulative Impacts on Wildlife Resources

The Colorado Division of Wildlife goals for deer and elk for 1990 would be met. This would be due to the habitat improvements and protection provided as claimed for the Continuation of Current Management Alternative. However, there are differences; and, as a result, the Protection Alternative is believed to have the better chance of goal attainment. While only 34 percent of the resource area would adopt deer and elk as the key wildlife management species, all areas within deer and elk ranges will receive attention to deer and elk range needs. The protective stipulations placed upon potential disturbing activities would be similar, yet the cumulative area in protective status is much greater. Riparian areas would be protected by the 100-foot no surface disturbance stipulations (except for the most imperative crossings), river corridor sensitive designations, and soils, recreation, cultural, and wilderness designations. Small game and nongame populations would be genuinely stimulated as they both would receive key management species status on specified areas (Appendix F). Also, the increased protective management for other species would allow most wildlife species advantage.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Impacts from Proposed Management Actions

Impacts from Threatened and Endangered Species Management. Applying stipulations to all known locations and areas (sites) with a very high potential for existence of threatened and endangered species would guard against adverse impacts to threatened and endangered species, their habitat, or their ability to maintain or increase in population. Chapter 3 lists the threatened and endangered species in this resource area. Chapter 3 also provides information of the status of these species, thus indicating the significance of actions that may affect the species.

Improving 4.3 miles of Colorado River cutthroat trout habitat would help to maintain the population of this fish. Preparing three habitat management plans (HMPs) with sensitive, threatened and endangered species as key for management would provide improved habitat and potential for species reintroduction and would chart a monitoring schedule. Key management species would include the peregrine falcon, bald eagle, Colorado River squawfish, razorback sucker, and the Great Basin silver-spot butterfly (which is a nominee to the federal listed threatened and endangered species).

Continuing to cooperate with the Colorado Division of Wildlife in the peregrine falcon recovery project would increase the chances of establishing a self-sustaining population.

Actively managing 297,820 acres for unique and sensitive species would greatly increase potential for maintaining or improving populations of those species. Preparing nine habitat management plans that select sensitive, threatened, and endangered species as key for management would help coordinate efforts of the Colorado Division of Wildlife, U.S. Fish and Wildlife Service, and the BLM to implement habitat improvements and reintroductions of these species (including peregrine falcon, bald eagle, black-footed ferret, Colorado River squawfish, humpback chub, and the bonytail chub).

Impacts from Water Resources Management. Limiting surface disturbance in the Palisade municipal watershed would help maintain riparian habitat for the Lewis' woodpecker, yellow-billed cuckoo, and prey species for peregrine falcons.

Watershed projects on Leach Creek, Hunter, Big Salt, and East Salt Washes would improve the habitat for prey species of sensitive raptors nesting along the Book Cliffs. Continuing management of the Badger Wash paired watersheds would maintain 170 acres of habitat for *Cryptantha elata* (sensitive) and the unique Gardner's saltbush/salina wildrye plant community.

In addition, the Protection Alternative would increase the acreage of watershed improvement projects by 61,000 acres which would help to increase the amount of prey for sensitive raptor species.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Maintaining existing withdrawals (primarily placer) on 36,300 acres along rivers or streams would help protect this important habitat for bald eagles. Closing 3,120 acres in Badger Wash to mineral entry would help protect *Cryptantha elata* and the Gardner's saltbush/salina wildrye plant community. Removing two sites from mineral sales would protect habitat for the sensitive Great Basin silverspot butterfly, the plant *Phacelia submutica*, and the threatened Uinta Basin hookless cactus.

Coal unsuitability criteria would not protect sensitive plant species, in particular the musine milk-vetch.

Applying no surface occupancy, no surface disturbance, and seasonal stipulations to oil and gas development including ten applications for permit to drill (APDs) in the Little Book Cliffs area would help protect threatened and endangered species. In addition, withdrawing from mineral entry the potential

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wilderness areas and land in Ruby and Rough Canyons would help to increase protection for bald eagles, peregrine falcons, two species of cacti, and other sensitive plants and animals. Greatly increasing the area closed to mineral materials sales or oil and gas leasing or surface occupancy would provide additional protection for sensitive, threatened and endangered species, and help maintain or improve their habitat.

Impacts from Forest Management. Prohibiting wood harvest in wooded riparian areas would help to maintain habitat for bald eagles and other sensitive species. Identifying 39,105 acres of conifers and aspen as unsuitable for management pending completion of timber production capability classification would help to maintain habitat for raptors, notably the flammulated owl, a migratory species of high federal interest.

Impacts from Wildlife Management. Increasing forage production to help increase big game and waterfowl populations would increase the carrion food base for bald eagles, providing support for an additional 10 birds. Protecting riparian habitat would help maintain important habitat for bald eagles and for sensitive species, including the great blue heron, black-crowned night heron, yellow-billed cuckoo, and the Lewis' woodpecker. Maintaining ponderosa pine seed trees and snags for wild turkey would also provide habitat for the Lewis' woodpecker. The Protection Alternative would, in addition, make available land for developing a 30- to 60-acre wildlife reservoir and marsh. This would create more hunting/scavenging area for bald eagles and peregrine falcons. It would also create feeding and nesting area for sensitive heron species, white-faced ibis, long-billed curlew, and snowy plover.

Impacts from Cultural Resource Management. Limiting surface disturbance in Transect 7 would help to protect spineless hedgehog cactus habitat.

Impacts from Recreation Resource Management. Managing two intensive recreation management areas would help to reduce the impact on threatened and endangered plants by centralizing the more intensive recreation uses. However, the Grand Valley Intensive Recreation Management Area could adversely affect habitat for the sensitive plant *Cryptantha elata* and sensitive animals such as the kit fox, Scott's oriole, and the leopard lizard.

Impacts from Off-Road Vehicle Management. Closing to off-road vehicle travel 40 percent of the area having the best peregrine falcon sites and closing portions of the areas with the most viable populations of spineless hedgehog cactus and *Cryptantha elata* would help to protect habitat for these species. Closing 259,243 acres to off-road vehicle use would increase protection of potential

sensitive, threatened, and endangered species and habitat in those areas.

Impacts from Visual Resource Management (VRM). Designating 273,995 acres as VRM Class I and 180,820 acres as VRM Class II would help to reduce surface disturbance and potential habitat for listed species.

Impacts from Wilderness Management. Designating all seven wilderness study areas as wilderness would provide greater protection for all listed threatened and endangered species (and habitat) that may be within these areas (see also Appendix I). Improving habitat through mechanized treatment would be prohibited and could reduce the opportunity to improve habitat by this method. Other methods such as fire might be suitable.

Impacts from Special Areas Management. Maintaining the Unawep Seep as a research natural area would protect habitat for one of three Colorado colonies of a sensitive species of butterfly. Designating Pyramid Rock as a research natural area would protect sensitive and threatened plant species in that area. Additionally designating Skipper's Island, Mount Garfield, South Shale Ridge, Rough Canyon, and the Badger Wash Uplands as areas of critical environmental concern would speedily address the needs of bald eagles, other raptors and several sensitive plant species.

Impacts from Public Utilities Management. Designating Ruby Canyon and the Gunnison and Dolores Rivers as sensitive to public utilities development would reduce river crossings of power lines and thus decrease the potential for bald eagle mortalities caused by collisions with the power lines. Designating 100 feet on each side of perennial streams as sensitive would protect almost all riparian habitat, including that of the threatened cut-throat trout. In addition, designating all riparian areas as sensitive or unsuitable would protect the areas most critical to bald eagles and other species needing riparian habitat.

Cumulative Impacts on Threatened and Endangered Species

Under this alternative, sensitive and threatened and endangered species and their potential habitat would receive the greatest protection, and active management designed to increase their populations would receive the most attention.

Protection Alternative Impacts

IMPACTS ON WILD HORSES

Impacts from Proposed Management Actions

Impacts from Wild Horse Management. Revising the Little Book Cliffs Wild Horse Management Plan to include wilderness management on a large portion of the Little Book Cliffs Wild Horse Range would give increased protection from surface-disturbing activities to the herd. Continuing to manage the wild horses as outlined in this plan would result in the continuation of a viable herd.

Impacts from Coal Management. Development of existing pre-FLPMA coal leases in lower Coal Canyon would reduce the critical wintering and foaling area by 10 percent. This would have a minor impact on the horse herd, but it would remain viable.

Impacts from Oil and Gas Management. Development of existing leases in the Little Book Cliffs area would detract from the natural character of the horse range but would not significantly impact the herd. This is because nine of the ten pending APDs (see Appendix E) are outside the horse range and the tenth pending APD and the 23 projected APDs would have seasonal stipulations placed on them as a condition of APD approval.

Placing 11,232 acres of the horse range in the No Surface Occupancy leasing category would help protect the horses.

Impacts from Forest Management. Prohibiting fuelwood or sawtimber harvest on the portion of the Little Book Cliffs Wild Horse Range that became wilderness would reduce the loss and harassment of the horse herd. Impacts in the remainder of the area would be the same as those discussed under the Continuation of Current Management Alternative.

Impacts from Off-Road Vehicle Management. Prohibiting off-road vehicle use on the portion of the Little Book Cliffs Wild Horse Range that becomes part of the wilderness area would further protect the wild horses from harassment. Impacts in the remainder of the wild horse range would be the same as those discussed under the Continuation of Current Management Alternative.

Impacts from Wilderness Management. Designating a portion of the Little Book Cliffs Wild Horse Range as a wilderness area would increase protection of the wild horses from harassment and forage loss from surface-disturbing activities except for development of pre-FLPMA oil and gas and coal leases. However, pre-FLPMA oil and gas leases and coal leases on most of the wild horse range inside the WSA could create a major amount of surface disturbance.

Impacts from Land Tenure Adjustment. Acquisition of 816 acres of private land within the horse range would remove hazardous barbed wire fencing and allow development of a spring to provide needed water.

Impacts from Transportation and Public Utility Management. Limiting use of all new roads to administrative use only would help to reduce harassment of the horse herd. Allowing no new rights-of-way in the wild horse range would also serve this purpose and would protect available forage.

Cumulative Impacts on Wild Horses

The impact of wilderness designation of a portion of the Little Book Cliffs Wild Horse Range would be increased protection of the wild horse herd from harassment and loss of forage. This would occur because no existing post-FLPMA oil and gas leases (about 250 acres) would be developed in the wilderness portion and no fuelwood sales, off-road vehicle access, or future oil and gas or coal leasing would be permitted. The remainder of the wild horse range would be protected by the No Surface Occupancy oil and gas leasing stipulation and by prohibiting further coal leasing. Thus, the horse herd would remain viable.

IMPACTS ON CULTURAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Cultural Resource Management. Actively managing nine high value prehistoric site areas (Transect 7, Indian Creek, Rough Canyon, Ladder Springs, Sieber Canyon, McDonald Creek, 5ME1358, Cactus Park, and Middle Mesa) and one high value historic site area (Sinbad Valley) would contribute to the cultural resources data base while increasing the potential for site protection and public interpretation. Protecting the remaining 152 known high value sites and 141 moderate value sites only to the extent required by law would result in continued natural deterioration and vandalism to these sites. Requiring cultural resources clearances before surface-disturbing activities would add to the cultural resource data base and decrease site destruction by surface-disturbing activities.

Impacts from Locatable Minerals, Leasable Minerals (Coal, Oil and Gas), and Mineral Materials Management. The decrease in acreage open to location or leasing would reduce (through fewer access roads) the amount of surface disturbance and vandalism to cultural sites. A lower demand for clearances (particularly in the areas closed to loca-

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tion or leasing) would, however, reduce the variety and quantity of new data available for prehistoric cultural understanding.

Impacts from Recreation Management. An increase of 117,000 acres in areas receiving intensive recreation management area designation would help to reduce surface-disturbing activities that degrade high value cultural sites within those areas. Preservation of significant cultural resources would be enhanced. Group use area designations in 26,260 acres of culturally-sensitive areas in Cactus Park, Little Park, Lower Unaweep, and Rabbit Valley would adversely impact known significant cultural resource sites through site vandalism and unauthorized collection.

Impacts from Off-Road Vehicle Management. The large increase in acreage (241,341 acres) closed to off-road vehicle use or limited to existing or designated roads and trails would substantially reduce surface disturbance of cultural sites and aid in the preservation of high value sites.

Impacts from Wilderness Management. Destruction of cultural sites would be significantly reduced in these areas because of the reduction in access roads and other surface-disturbing activities. However, new sites would not be found through surveys prior to surface-disturbing activities and excavation of sites would generally not be permitted. Stabilization on one historic structure in Sewemup Mesa might not be accomplished due to protection of wilderness values.

Impacts from Transportation Management. Acquiring public access to the Indian Creek archaeological area of critical environmental concern would increase surface destruction and vandalism to cultural resources in this area.

Cumulative Impacts on Cultural Resources

Cumulative impacts would include a reduction in the amount of vandalism and disturbance to eight additional high value cultural sites. Reductions in the acreage available for mineral location or leasing would result in fewer clearances and a decrease in the amount of new data for understanding prehistoric cultures in the resource area. Wilderness designation would give increased protection to sites in those areas but would prevent discovery of new sites through development. Excavation of sites in designated wilderness would generally not be allowed. Public access acquisition to the Indian Creek area would increase the potential for vandalism and site destruction in the Indian Creek Area of Critical Environmental Concern.

An increase in the number of high value areas in oil and gas no surface occupancy category would

encourage scientific research over salvage mitigation in these areas.

IMPACTS ON RECREATION RESOURCES

Impacts from Proposed Management Actions

Impacts from Recreation Management. Managing eight IRMAs (see Chapter 2, Summary of Management Actions, for location and description) would reduce user conflicts, provide for some commercial recreational use, and provide a variety of recreational settings and opportunities. Managing the Battlement Mesa quality hunting area would provide a place for hunting accessible by horseback or on foot only.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Withdrawing wilderness areas, South Shale Ridge, Ruby, Bang's and Hunter/Garvey Canyons, Granite Creek, the Dolores and Gunnison River Canyons, Sinbad Valley, and Mount Garfield from mineral entry would provide effective protection for recreational settings and opportunities. However, existing claims and oil and gas leases would allow degradation of recreation settings in South Shale Ridge, Hunter/Garvey Canyons, and Mount Garfield. Developing ten pending APDs and 23 projected APDs in the Little Book Cliffs area would have the same impacts as those discussed under the Continuation of Current Management Alternative.

Impacts from Forest Management. Continuing fuelwood and sawtimber harvests would result in a degradation of national recreation settings.

Impacts from Wildlife Management. Stipulations protecting critical big game habitat and managing habitat to help improve it for a variety of wildlife and aquatic species would enhance recreational opportunities for wildlife viewing, backpacking, hunting, and fishing. Wildlife management proposals would greatly improve wildlife related recreation opportunities (hunting, viewing, and fishing) and provide protection to important recreation settings.

Impacts from Threatened and Endangered Species Management. Management proposals for threatened and endangered species would also provide some protection to important recreation settings and opportunities.

Impacts from Visual Resource Management. Greatly increasing the acreage protected under VRM Classes I and II designations would prevent degradation of high quality recreational settings, pri-

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marily in wilderness areas and intensive recreation management areas.

Impacts from Off-Road Vehicle (ORV) Management. Increasing the areas closed to ORVs by 241,341 acres and limiting access to designated and existing roads in an additional 794,846 acres would help to protect recreation values and opportunities in a much greater extent of the resource area. Visitor use conflicts would also be reduced.

Impacts from Wilderness Management. Designating all seven WSAs as wilderness would provide the most protection to existing recreational values in these areas, and increase the opportunities for enjoying high quality recreation settings.

Impacts from Special Areas Management. Designating South Shale Ridge and Mount Garfield as areas of critical environmental concern would protect scenic values and high quality recreation settings in these areas.

Impacts from Land Tenure Adjustments. Acquiring private land in Ruby Canyon (Crow Bottom and the Loma launch site), would improve recreation management and increase user opportunities for outdoor recreation.

Impacts from Transportation Management. Acquiring additional access to large blocks of public land would greatly increase opportunities for outdoor recreational use of public land. This would be particularly true in the Roan Creek drainage, Book Cliffs, and Glade Park.

Impacts from Public Utilities Management. Increasing the acreage under unsuitable and sensitive designations would extend protection for recreational settings in the wilderness study areas and South Shale Ridge, Hunter/Garvey Canyons, Mount Garfield, Ruby Canyon, Bang's Canyon, and the Dolores and Gunnison River Canyons.

Impacts from Fire Management. Controlling fires could prevent the development of natural settings important for high quality recreational opportunities in the resource area.

Cumulative Impacts on Recreation Resources

Overall impacts from proposed resource management actions under this alternative would improve and increase the variety and opportunity to enjoy high quality recreational settings.

IMPACTS ON OFF-ROAD VEHICLES

Impacts from Proposed Management Actions

Impacts from Off-Road Vehicle Management. Closing 259,243 acres to off-road vehicle use would provide the most protection for fragile resource values such as wildlife and soils. However, identifying only two small areas for competitive and intensive cross-country ORV use would not meet public demand for off-road vehicle areas.

Impacts from Wildlife Management. Seasonal closures of big game winter range to off-road vehicle use in the wild horse range, the Beehive, Chalk Mountain, Land's End, the Sunnyside area, Big Salt Wash, and Blue Mesa would reduce the opportunity and areas accessible for winter off-road vehicle use.

Impacts from Wild Horse Management. Limiting off-road vehicle use to designated roads and seasonally closing critical big game winter range would reduce off-road vehicle use in the wild horse range, particularly in Coal Canyon.

Impacts from Cultural Resource Management. Limiting off-road vehicle use to designated roads in Transect 7 because of cultural resource values would reduce off-road vehicle opportunities in this area.

Impacts from Recreation Resource Management. Limiting off-road vehicle use to designated roads in South Shale Ridge, Sinbad Valley, Rabbit Valley, Hunter/Garvey Canyons, Lower Flume, Devil's, Pollack, and Ruby Canyons, the south slope of Battlement Mesa, and Bang's Canyon would reduce the amount and variety of land open to off-road vehicle access. Cross-country off-road vehicle demand is high in lower Flume, Devil's, and Pollack Canyons and moderate in Rabbit Valley.

Impacts from Visual Resource Management. Closing 9,520 acres of public land along the face of the Book Cliffs to off-road vehicle use would decrease areas available for off-road vehicle access and reduce the variety of opportunities.

Impacts from Wilderness Management. Designating all seven wilderness study areas as wilderness would have little effect on off-road vehicle cross-country use with the exception of The Palisade. In The Palisade, a reduction in current off-road vehicle use and opportunity would occur. Off-road vehicle use is minimal to nonexistent in other wilderness study areas.

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Cumulative Impacts on Off-Road Vehicle Management

The net impact would be a large reduction in the area available for off-road vehicle use and in the variety and opportunity for the off-road vehicle user. This alternative would provide the most restrictions on ORV use.

IMPACTS ON VISUAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Visual Resource Management (VRM). Designating all seven wilderness study areas (WSAs) as wilderness and managing the face of Mount Garfield, the cliffs in Sinbad Valley, and Ruby Canyon as VRM Class I would help to maintain the highly scenic quality of these areas. Designating Sinbad Valley, the Dolores River Canyon, De Beque and Unaweep Canyons, South Shale Ridge, the Roan Creek area, the face of the Book Cliffs, the slopes of Grand Mesa, Douglas Pass, and the Collbran valley as VRM Class II would provide a high level of protection from landscape degradation to these areas. The remainder (825,245 acres) of the area would not receive protection from VRM class designations.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Developing oil and gas in the Book Cliffs area, Roan Cliffs area, De Beque cutoff, the Collbran valley, and the slopes of Grand Mesa would continue to degrade visual resources in these areas. Developing coal along the face of the Book Cliffs, uranium in the Gateway area, and oil shale in the De Beque area would also result in degradation of high quality visual resources. Visual resource management class designations would provide some protection to these visually important areas.

Impacts from Forest Management. Modifying forest management practices in VRM Class II areas would help protect the scenic quality from degradation. Continuing forest management practices in the remainder of the resource area with no VRM class designations (825,245 acres) would degrade visual resources in those areas.

Impacts from Wildlife and Threatened and Endangered Species Management. Protecting wildlife habitat and threatened and endangered species through special stipulations would complement visual resource management objectives.

Impacts from Recreation Management. Managing for semi-primitive non-motorized and semi-primitive motorized recreation opportunities in eight

intensive recreation management areas (310,000 acres) would help to maintain visual resources and scenic qualities in those areas.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle use to designated or existing roads and closing certain areas to their entry would result in a large decrease in the degradation of visual resources caused by cross-country travel and competitive events. The most notable potential for improvement would be in the Grand Valley.

Impacts from Wilderness Management. Designating all seven wilderness study areas as wilderness under VRM Class I management would maintain the high quality of visual resources in those areas except in the areas of surface disturbance from pre-FLPMA coal and oil and gas leases in Demaree Canyon and the Little Book Cliffs WSAs.

Impacts from Land Tenure Adjustment. Acquiring the private land identified under this alternative would add highly scenic visual resources to public land and protect them from degradation.

Impacts from Public Utilities Management. Designating 402,599 acres as unsuitable to public utilities would protect visual resources from degradation in those areas. Modifying public utility routes or designs on 761,532 acres sensitive to public utilities would help to maintain visual quality.

Impacts from Fire Management. Managing fires to allow greater natural diversity to occur would increase scenic quality in the areas affected by fire.

Cumulative Impacts on Visual Resource Management

Designating almost 36 percent of the resource area (454,815 acres) as VRM Class I and II would provide protection to almost all of the highly scenic visual resources. Modifying other resource management actions to reduce adverse impacts on visual resources would provide limited protection of scenic quality in the remainder of the resource area.

IMPACTS ON WILDERNESS

Impacts from Proposed Management Actions

Impacts from Wilderness Management. Recommending all seven wilderness study areas (WSAs) for wilderness preservation would result in their designation as wilderness (assuming the Secretary of the Interior and congress would adopt these recommendations). However, development of pre-FLPMA coal and oil and gas leases in Demaree

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Canyon and Little Book Cliffs WSAs could disqualify a portion or all of these two WSAs from wilderness consideration.

Designation of the seven WSAs as wilderness (252,555 acres with expanded boundaries to enhance manageability) would protect their wilderness values, prevent disruption of natural ecosystems, and expand the acreage and the diversity of the National Wilderness Preservation System (NWPS). Through Congressional designation as wilderness, each WSA would be afforded protection under the 1964 Wilderness Act including preservation of their natural conditions, wilderness values, and special features (ecological, geological, or other features of scientific, educational, scenic or historical value). These designations, by expanding the supply of wilderness recreation opportunities, would help meet a nationwide wilderness demand that is growing at a rate of 10 percent annually.

These WSAs are representative of the Colorado Plateau Ecotype which is not well represented in the NWPS. The diversity in the NWPS would be expanded by the addition of WSAs that contain large, multiple, highly-scenic canyon systems. One WSA contains a high pinyon-juniper covered mesa that has many ecological values because of its naturalness.

Impacts from Air Quality Management. Managing the seven wilderness areas under Class II air quality standards would help preserve the areas' naturalness and influence opportunities to experience outstanding solitude and outstanding primitive recreation.

Impacts from Locatable Minerals Management. Impacts from withdrawing all seven WSAs from locatable minerals would help preserve the areas' wilderness characteristics. Development of existing mining claims with valid existing rights would have adverse impacts on all wilderness characteristics.

Impacts from Coal Management. Prohibiting further coal leasing in Demaree Canyon and Little Book Cliffs WSAs would help preserve these two WSAs' wilderness characteristics. Impacts from developing pre-FLPMA coal leases (Demaree Canyon—222 acres and Little Book Cliffs—1,934 acres) would impair the wilderness values of these WSAs. Existing leases are located on the periphery of these units; therefore, the major impacts would be Zone 1 (see Figures 4-2 and 4-3). Coal development in these WSAs would create new roads, modify their natural landscapes and diminish opportunities to experience outstanding solitude and/or primitive and unconfined recreation. Over time, both Zones 1 and 2 would probably be so impacted that they no longer would possess wilderness potential. Coal reserves do not exist on the other WSAs.

Impacts from Oil and Gas Management. Prohibiting future oil and gas leasing in the Black Ridge WSAs, The Palisade, Dominguez Canyon, and Sewemup Mesa WSAs would help preserve these areas' wilderness characteristics. Prohibiting future oil and gas development of post-FLPMA leases in the Demaree Canyon and Little Book Cliffs WSAs would preserve wilderness characteristics only in the areas of post-FLPMA leases. Development of pre-FLPMA oil and gas leases would occur in the Demaree Canyon and Little Book Cliffs WSAs where the probability of development is high as evidenced by the areas being completely under oil and gas leases. BLM has estimated there will be 33 wells developed in the Demaree Canyon WSA over the next 20 years. The resulting surface disturbance would segment these WSAs into parcels of less than 5,000 acres in size, disrupt naturalness and minimize opportunities to experience outstanding solitude and/or primitive and unconfined recreation. Special features in the Little Book Cliffs WSA would also be impaired.

Development of ten APDs in the Little Book Cliffs area would have the following impacts: Two of the APDs are outside of the Little Book Cliffs WSA and would have no impact on wilderness characteristics. Development of seven APDs in Zone 1 would directly impact about 62 acres and would eliminate this northern portion of Zone 1 from further wilderness consideration. This would constrain Congress' ability to designate the balance of the area as wilderness. One well in Zone 2 would impact about 9 acres and would be a major impact on the unit. Any development in Zone 2 incrementally lessens this core area from being manageable as wilderness. Further well development on the pre-FLPMA leases that make up more than 90 percent of Zone 2 could make the entire WSA unsuitable for wilderness designation.

The probability for oil and gas development is low in all the WSAs except for Sewemup Mesa which is moderate. The only oil and gas lease in these WSAs is in The Palisade, where a pre-FLPMA lease extends into the WSA and covers 120 acres. Overall, the impact from oil and gas would be expected to be minimal.

Impacts from Mineral Materials Management. Prohibiting the extraction of mineral materials would help preserve wilderness characteristics in all seven WSAs.

Impacts from Wildlife Management and Threatened and Endangered Species Management. Intermittent impacts on solitude would occur from the use of helicopters to manage raptors in the Black Ridge Canyons, Dominguez Canyon, The Palisade, and Sewemup Mesa WSAs. Wildlife introductions and related management such as for big-

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horn sheep would intermittently disturb outstanding opportunities for solitude and leave vehicle tracks. Overall, these impacts would generally be of short duration, provided vehicles remained on existing ways.

Impacts from Livestock Grazing Management.

Where practical alternatives to motorized access do not exist, maintenance and other activities accomplished by vehicles would have intermittent impacts on outstanding opportunities for solitude and primitive recreation. Vehicles driving off ways would also impact naturalness. Reservoir maintenance requiring the use of a tracked vehicle would further increase this surface disturbance unless the vehicle could be brought in by trail or rubber-tired vehicles were used. These impacts would be of a short duration, though significant when occurring.

Impacts from Wild Horse Management. Management of the wild horses in the Little Book Cliffs WSA would periodically decrease the outstanding opportunities for solitude. This would occur any time mechanical equipment was used to round up horses. Vehicle track and any other surface disturbance would reduce the naturalness of the area.

Impacts from Recreation Resource Management. Increased primitive recreation use of these wilderness areas would lessen their natural character and decrease outstanding opportunities for solitude. This impact would be mitigated through the development and implementation of a wilderness management plan for each WSA.

Impacts from Off-Road Vehicle Management. All wilderness areas are closed to off-road vehicles. Ineffective enforcement of these closures would lessen the naturalness of these areas by the creation of vehicle tracks and would reduce opportunities to experience outstanding solitude. Outstanding opportunities for primitive recreation would also be impacted by the sights and sounds of off-road vehicles in a designated wilderness.

Impacts from Land Tenure Adjustments. Acquisition of 320 acres of private land and 600 acres of state land (Colorado Division of Wildlife) would enhance the manageability of the Dominguez Canyon Wilderness Study Area. Both parcels of land are inholdings in this wilderness study area.

Impacts from Fire Management. Fires that threaten life and property would require suppression efforts that may include mechanical equipment. Use of this equipment would disturb naturalness at least temporarily. Outstanding opportunities for solitude may also be temporarily lost through the use of mechanical equipment including vehicles, helicopters, and chainsaws during fire suppression efforts.

Cumulative Impacts on Wilderness

Recommending wilderness designation of the seven WSAs would protect their wilderness values and expand the acreage and diversity of the National Wilderness Preservation System by 252,555 acres. This expanded supply of the Colorado Plateau Ecotype wilderness would help meet the national wilderness demand which is increasing by 10 percent yearly as well as regional demands.

Management of all resources in WSAs would have to be consistent with protection of the wilderness resources, including these seven WSAs' existing natural and roadless character, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Scenic, ecological, botanical, zoological, cultural, scientific values as well as multiple resource benefits of wilderness designation would be preserved or allowed to evolve in a natural ecosystem for the enjoyment and study by present and future generations.

Impacts from motorized access and use of mechanical equipment would periodically decrease outstanding opportunities for solitude and primitive and unconfined recreation. Surface disturbance from vehicle tracks, especially off of existing ways, will lessen the natural character of the WSAs, but these impacts would be very limited in size and duration.

IMPACTS ON SOCIAL AND ECONOMIC CONDITIONS

Impacts from Proposed Management Actions.

Impacts from Water Resource Management. Projects to reduce sediment yield and salinity would contribute to lower water treatment costs downstream. The anticipated salinity reduction of 3,300 to 11,000 tons per year would eventually reduce salinity costs in the lower Colorado River basin by \$185,000 to \$600,000 annually. Local benefits would result from increased soil productivity and reduced facility treatment costs (e.g., less frequent removal of reservoir sedimentation). The economic benefit would be slightly offset as a result of sediment and salinity increases due to activities associated with management of other resources.

Impacts from Coal Management. The exclusion of 141,352 acres (about 40 percent of the unleased coal resource) from further leasing consideration would not likely have local social or economic impacts since it will not affect production levels during the life of the plan. However, because many of the areas proposed for exclusion are adjacent to exist-

Protection Alternative Impacts

ing mines and leases, potential expansion areas would be removed. This could adversely affect mine operators and lease holders when the currently leased resource is mined out (in 20 to 40 years) or if expansion is sought to produce a more economic property. The size of the proposed exclusion and the location of several of the excluded areas in the more accessible portions of the coal area could have a downward influence on production levels in the very distant future, thus affecting the potential for employment and the generation of income and government revenue.

Impacts from Oil and Gas Management. Stipulations placed on oil and gas leases in the Grand Junction Resource Area would not likely have measurable social or economic impacts. Most of the moderate to high potential oil and gas lands are already leased, and new stipulations would not apply to their development. To the extent that restrictive lease terms do affect drilling operations, costs would increase, creating the potential for lower production and reduced royalty revenue to the federal government and Colorado. Any impacts would be felt more by individual lease holders than by the local oil and gas industry since the industry is more reliant on production in eastern Utah and other parts of western Colorado than upon production in the resource area.

Approval of ten pending APDs in the Little Book Cliffs area could result in annual gas sales of about \$800,000. In addition to generating \$100,000 in royalty payments, those sales would support six jobs and over \$100,000 in local income. The potential drilling of 23 more gas wells in the Little Book Cliffs WSA would result in just over twice the economic impacts created by the pending applications.

Impacts from Mineral Materials Management. The closure of 612,606 additional acres to sales or free use of mineral materials is unlikely to have measurable economic effect in the short term. In the long term, however, this great a reduction in the supply of mineral materials would increase their cost as alternative supplies would have to be brought from greater distances.

Impacts from Forest Management. The sale of 2,200 cords of fuelwood annually would help offset residential energy costs and produce about \$10,000 in federal revenue. To the extent purchases were by commercial fuelwood cutters, local employment and income would be supported.

Impacts from Wildlife Management. Efforts to increase forage availability for big game would work toward reduced crop losses by owners of farms and orchards in crucial winter range areas.

Impacts from Wilderness Management. Designation of seven wilderness areas would increase

recreation use in the Grand Junction Resource Area. Improved access and greater public awareness of these areas would draw recreationists from outside the resource area. While some of the recreation use would be displaced activity from other wilderness areas, much of it would be new activity brought about by the unique character of these wilderness areas.

Economic benefits would be diffuse but would concentrate on those businesses providing tourist and recreation sales and services. Small, but particularly noticeable benefits could accrue to the small communities in the southern half of the resource area. Some loss of mineral resources would be encountered but, by and large, rights to those resources have already been secured and their development would not be impeded. Further detail on the economic impacts of wilderness designation is presented in Appendix I.

Impacts from Land Tenure Adjustments. The 7,635 acres made available for disposal would add about 1 percent to the resource area's private land base. Impacts on the price of other undeveloped land are unlikely, except in the case of adjacent land owners who may be adversely affected.

If all the tracts were sold (and not exchanged), sales revenue could be as much as \$2.3 million based on an estimated average sales price of \$300 per acre. Receipts would go primarily to the federal treasury. Local property tax revenues would increase but payments in lieu of taxes would decline.

Cumulative Impacts on Social and Economic Conditions.

The cumulative impact on the local economy is likely to be beneficial but not large. Active management of several wilderness areas could produce locally significant economic benefits. Some individuals, particularly mineral leaseholders and owners of land adjacent to public lands offered for sale, could be affected by recommendations found in this alternative.

IMPACTS ON TRANSPORTATION

Impacts from Proposed Management Actions

Impacts from Transportation Management. Acquiring 61.5 miles of public road access, 10.25 miles of administrative road access, 4.25 miles of public trail access, and 2.0 miles of administrative trail access would increase substantially public and administrative access in the resource area. Acquir-

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ing this additional access would open up 39 isolated public land areas to public use.

The closure of 12 roads would restrict vehicle access and public use of 28,530 acres of public land that reasonably would be accessible by vehicle. The closures would not affect foot access in these areas.

IMPACTS ON PUBLIC UTILITIES

Impacts from Proposed Management Actions

Impacts from Public Utilities Management. Classifying public land as suitable (115,729 acres), sensitive (761,532 acres), and unsuitable (402,799 acres) would provide utility companies with information with which to plan and design utility projects. This would save both the utility companies and the BLM time and money by not having to redesign projects. However, compared with the Continuation of Current Management Alternative, 142,690 additional acres would be placed in the sensitive category. And the acreage suitable for public utilities would decrease by 354,370 acres. Most of the decrease in suitable acreage (200,000 acres) would result from applying restrictions to prevent project construction on slopes over 40 percent. An additional decrease (100,000 acres) would result from applying restrictions in VRM Class II and recommended wilderness areas (Summary Table, Chapter 2).

Restriction of projects on slopes greater than 40 percent would have a moderate impact on public utility companies in that they would have to route projects to avoid steep slopes. Since most projects are currently located on slopes less than 40 percent, this requirement would probably not be a major impact on public utility companies.

Restriction of projects in South Shale Ridge and the Demaree Canyon and Little Book Cliffs WSAs would have a major impact on public utility companies. These areas all receive a moderate amount of oil and gas activity and have been considered separately as routing alternatives for at least three major oil and gas pipelines and one major power line. Project routing to avoid these areas could involve considerable expense to public utility companies. The same situation applies to the face of the Book Cliffs and the slopes of Grand Mesa, which would be designated as VRM Class II. These areas have been considered for location of major power line projects.

PREFERRED ALTERNATIVE IMPACTS

IMPACTS ON AIR QUALITY

Impacts from Proposed Management Actions

Short-term localized impacts on air quality would result from vegetation manipulation practices. These impacts would be small in scale and dispersed throughout the resource area. These factors combined with required management stipulations for vegetation manipulations would reduce the significance of the impacts. Limiting off-road vehicle use through closures or restrictions would decrease soil erosion and fugitive dust emissions, particularly within the Mesa County designated TSP nonattainment area. Dust suppression control devices would be impractical.

Cumulative Impacts on Air Quality

Increased levels of air pollution are anticipated from regional growth and energy minerals development. Emissions from primary sources would be minimized through applicable policies, regulations, and statutes.

IMPACTS ON SOILS

Impacts from Proposed Management Actions

Implementing soil erosion and sediment control measures on 169,600 acres of critically-eroding soils would help reduce erosion losses by 0.1 to 1.0 ton per acre disturbed per year compared to that under the Continuation of Current Management Alternative. Treating 1,000 acres in Cactus Park would also help to reduce soil and gully erosion.

Overall increases in the acreage closed to off-road vehicle use and to exploration and development of locatable, salable, and leasable minerals and greater emphasis on intensive recreation management areas would help to decrease soil erosion and sediment yield by reducing the amount of surface disturbance in the affected areas. Impacts on 18,000 acres in the Baxter-Douglas Pass area identified as having an extremely high slump hazard would be the same as those under the Continuation of Current Management Alternative. Protecting 860 acres of high soil slump hazard in the Plateau Creek area would reduce the potential for property loss and decrease the severity of soil loss.

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Development of ten pending APDs in the Little Book Cliffs area would increase soil erosion and sediment yield until well sites and access roads were reclaimed. Drilling 23 projected wells in the Little Book Cliffs WSA would further increase soil erosion and sediment yield. Development of 33 new wells in the Demaree Canyon WSA would also increase short-term soil erosion until successful reclamation took place. In addition, a number of well sites could potentially be located on soils having an extremely high probability of slumping when cuts are made in the sideslopes. Loss of the well pad site and access road could occur, along with extensive slumping and soil erosion in the adjacent area. The No Surface Occupancy stipulation would reduce or eliminate these impacts on the post-FLPMA leases.

Cumulative Impacts on Soils

The cumulative impacts would be a reduction in soil erosion and sediment yield as compared to the Continuation of Current Management Alternative.

IMPACTS ON WATER RESOURCES

Impacts from Proposed Management Actions

Impacts from Water Resources Management. Treating selected lands in the resource area with watershed improvements would reduce sediment yield from these areas by 1 to 6 tons per acre per year and result in a total resource area-wide salinity reduction of 2,500 to 10,000 tons per year.

Stream stabilization work along 55 miles of severely-eroding stream channels would attempt to reduce sediment (and salinity in some cases) by about one-third.

Maintaining the check and retention dams in Indian Wash and Leach Creek (spread over approximately 6,000 acres) would provide water quality and flood control benefits. An estimated 15,000 to 20,000 tons of sediment and 800 to 1,000 tons of salt would be prevented from entering the Colorado River annually. Flood control benefits to Grand Junction would continue.

Limiting surface disturbance in the Jerry Creek watershed and in the Palisade municipal watershed would help to protect those water supplies. Similarly, the no surface occupancy stipulation for oil and gas development on the BLM part of the Grand Junction municipal watershed would help protect the water quality of that supply.

Management of Badger Wash as a hydrologic research area (685 acres) would enable the BLM to

study the impacts of surface-disturbing activities. In particular, by leasing the area for oil and gas development and controlling that development, the BLM can quantify the impacts of oil and gas development on sediment and salinity yield of the Mancos Shale.

Restricting development within wetlands and 100-year flood plains would provide important wildlife and flood protection benefits associated with wetlands and flood plains.

Impacts from Locatable Minerals Management. Leaving 1.18 million acres of the resource area open to locatables could potentially degrade water quality in parts of the resource area. The major impacts would result from increased sediment introduced to streams from construction of associated mine roads or from placer mining operations. Heavy metal contamination from spoil piles could also occur. Impacts cannot be quantified without site-specific information. The Gateway area presently experiences water quality degradation from past and present uranium mining activities. Approximately 86,000 fewer acres would be open to locatables under this alternative compared to the Continuation of Current Management Alternative.

Impacts from Coal Management. Identifying 350,389 acres (24,000 acres more than the Continuation of Current Management Alternative) as acceptable for further coal leasing consideration could impact water resources. Mining activities would increase sediment and possibly salinity yield to streams from construction of associated mine roads and surface facilities. Potential water quality degradation may result from spoil pile runoff. Underground mining could disrupt ground water systems causing changes in quantity and quality of ground water. Mitigation would be imposed to minimize most of these impacts.

Designating 14,100 acres based on coal unsuitability review as unsuitable for further coal leasing consideration would prevent water quality and flow impacts associated with mining activities from occurring. Subsurface mining in the Colorado River corridor and Palisade municipal watershed could create significant subsidence with surface expression. This could result in loss of some or all of the perennial stream flow in the municipal watershed and in the Colorado River by leakage to the mining zone. The Palisade municipal supply could thereby be lost or reduced. Designating these areas as unsuitable would prevent these impacts from occurring.

Development of an existing coal lease in the lower portion of the Palisade municipal watershed (identified as unsuitable) would not have a significant effect on Palisade's water supplies. This por-

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tion of the watershed is mainly used for water transmission facilities. Cabin Reservoir also partly overlies this lease. By not mining directly under the streams or reservoirs, no impacts on the reservoirs or streams from subsidence should occur. Any impacts to the transmission facilities could quickly be remedied by the coal company responsible. Any site-specific impacts of developing this lease would be addressed when a mine plan was submitted.

Allowing surface facilities along the Colorado River could increase sediment yield to the river. The surface facilities, if in the flood plain, could experience flooding problems and affect the beneficial functions of flood plains. Those functions include dissipating energy from flood waters, controlling storm related erosion along stream banks, trapping sediment and other organic and mineral constituents, and aquifer recharge.

Impacts from Oil and Gas Management. Oil and gas activities require construction of roads, pads, and pipelines. This surface disturbance causes increased sedimentation and, possibly, salinity entering streams. These water quality impacts decrease to near preconstruction levels after proper rehabilitation. Pads, roads, and pipelines that are not rehabilitated or maintained remain as significant sediment sources.

Placing 624,348 acres in an open to leasing category which would have standard lease terms would leave those lands open to water quality impacts from oil and gas development. The site-specific impacts would be determined when the applications for permit to drill are received. Many of these short-term adverse impacts would be mitigated by actions imposed through standard lease terms.

Placing 149,087 acres in a closed to leasing category would prevent water quality degradation associated with oil and gas development on those lands. None of these lands would be closed to leasing because of sensitive watershed values.

Placing 1,925 acres in the Badger Wash hydrologic study area and Grand Junction municipal watershed in a no surface occupancy (NSO) category for watershed protection would eliminate onsite adverse water quality impacts from oil and gas drilling. Water quality impacts that are avoided by the NSO stipulation include heavy metal and total suspended solids contamination from leakage from reserve pits and sedimentation increases associated with site (pad) preparation. Potential water quality impacts such as sedimentation could occur from road and pipeline construction, however.

Placing 554,263 acres in an other stipulations leasing category would minimize water quality degradation associated with oil and gas development.

Specific impacts would be determined when the applications for permit to drill were received.

Development of the 10 pending APDs in the Little Book Cliffs area and the projected 23 APDs in the Little Book Cliffs Wilderness Study Area would disturb an estimated 235 acres for road, drill pad, and pipeline construction. This surface disturbance would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Further water quality impacts could occur from reserve pit leakage causing increased levels of total dissolved solids and heavy metals in receiving waters. Potential sediment impacts occurring from approximately 120 acres would decrease to near predevelopment levels following successful rehabilitation. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Developing 33 projected new wells in Demaree Canyon Wilderness Study Area would disturb approximately 250 acres for road, drill pad, and pipeline construction. These construction activities would cause increased sedimentation degrading water quality if it occurred adjacent to surface waters. Additional water quality impacts could occur from reserve pit leakage causing elevated total dissolved solid and heavy metal levels in receiving waters. Potential sediment impacts occurring from approximately 125 acres would decrease to predevelopment levels as the area was rehabilitated. Specific impacts associated with oil and gas development to water resources cannot be determined until specific drill sites and pipeline and road alignments have been identified.

Impacts from Mineral Materials Management. Mining of mineral materials has the potential for localized short-term water quality degradation, mostly from increased sediment. However, proper mitigation could keep the problems minor. Approximately 185,000 fewer acres would be open to sales and free use permits in this alternative compared to the Continuation of Current Management Alternative.

Impacts from Forest Management. Activities associated with managing 111,000 acres of pinyon-juniper would increase sediment. Most sediment would be produced from road construction, road use, and skidding of trees. The highest sediment yields would be in those areas near streams with highly-erosive soils. However, proper mitigation could keep the impacts minor.

Impacts from Wildlife Management. Varying wildlife management would have both beneficial and adverse water quality impacts. Proposed vegetation manipulations would have a localized, one to two-year impact on water resources, mostly an in-

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crease in sediment. The protection of fisheries and riparian habitat would help to protect water resources by limiting surface disturbance and filtering sediment produced from adjacent upland areas.

Impacts from Recreation Resource Management. Redirecting and increasing use of public land for recreation purposes would cause localized increases in water quality problems associated with human use.

Impacts from Visual Resource Management. Management would have some secondary benefits to water quality by restricting development, but this would not readily be quantifiable.

Impacts from Off-Road Vehicle Management. The net effect of the greatly increased restrictions on vehicle use (closures and limitations) would be to improve water quality. Sediment yield would decrease in many areas because of off-road vehicle use limitations. The magnitude of these effects is not readily quantifiable but would be a very positive benefit.

Impacts from Wilderness Management. Impacts from designating four WSAs for wilderness generally benefit water quality by preventing potential surface disturbances from development. This would allow increased sediment yield from those areas. Conversely, watershed rehabilitation work would be allowed in The Palisade and Little Book Cliffs WSAs that would not be allowed under wilderness designation.

Impacts from Transportation Management. Increased vehicle travel associated with new public access would slightly increase sediment yield (less than 10 percent). In those areas where new roads would be built, sediment yield would increase much more. The magnitude of this increase would be dependent on the roads' location and design. The cumulative effect of these proposals on water resources would generally be low.

Impacts from Public Utilities Management. The acreage unsuitable or sensitive under this alternative is much greater than under the Continuation of Current Management Alternative. Theoretically, this would limit increases in sediment yield from public land due to public utility construction. However, many of the unsuitable or sensitive designations are based on land use decisions and not environmental considerations. Therefore, a new route could be less environmentally sound and cause more water quality problems, mostly sediment. Thus, the net effect on water resources cannot be calculated without site-specific information.

Impacts from Fire Management. The effects of fire management on water resources are very difficult to predict or quantify on a resource area-wide

basis because of the tradeoffs involved between positive and negative, long-term and short-term effects of fire. Site-specific information would be necessary to predict and quantify exact effects.

Fires, whether natural or man-caused, destroy much of the vegetative cover. This, in turn, causes short-term water quality problems because of increases in nutrients and sediment entering the streams. As the vegetation reestablishes, these increased sediments and nutrients decline to, or below, preburn levels. Suppression of fires helps keep down the short-term increases in sediment and nutrients, but may not allow the long-term decreases in sediment yield related to increased vegetative cover often resulting after fires.

This relationship may not hold for areas with steep slopes, poor vegetative productivity, or poor or highly-erosive soils. These areas are often very slow to recover and, thus, fires should be suppressed quickly. Site-specific information would be necessary to predict and quantify exact effects.

Suppression activities would also contribute to short-term water quality problems. Surface disturbance caused by construction of fire access roads, fire lines, fire breaks, etc., would compound the sediment yield increases caused by the fire. Also, any fire retardant used could eventually be washed into streams, causing a short-term decline in water quality.

Cumulative Impacts on Water Resources

Under this alternative, proposed management actions would decrease sediment and salinity yield into the Colorado River. The exact magnitude of this decrease is unquantifiable at this time. The magnitude would depend on the reductions in sediment and salinity that watershed rehabilitation treatments would accomplish on the 194,000 acres of the resource area yielding high levels of salt or sediment available for treatment. This would not be known until area-specific activity plans were developed.

Slightly offsetting these decreases would be some additional sediment and salt yields from increased development. Most of these effects would come from roads and other surface disturbances resulting from increases in oil and gas, forestry, and off-road vehicle activities (increased due to increasing population, not management). Under this alternative, more control over these activities would be used through limitations and formal designation of areas for particular purposes. This would allow the BLM to limit the increases in sediment yields somewhat.

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IMPACTS ON LOCATABLE MINERALS

Impacts from Proposed Management Actions

Impacts from Locatable Minerals Management. Identifying 1,180,881 acres as open would make this acreage open to location under the general mining laws. Compared with the Continuation of Current Management Alternative, 85,667 fewer acres would be open to location.

Removing 400 acres from existing withdrawals and continuing the existing withdrawals on 124,443 acres in addition to withdrawing an additional 154,067 acres in various locations would eliminate a total of 278,510 acres from location. All areas withdrawn have low to nil economic development potential.

IMPACTS ON COAL

Impacts from Proposed Management Actions

Impacts from Coal Management. Identifying 350,389 acres of public minerals as acceptable for further leasing would make an estimated 4,161 million short tons of in-place (measured, indicated and inferred) coal available for leasing. The reserve estimates are based on information from Schwochow 1978 and Hornbaker, et al 1976. This is an increase of 24,427 acres and 321.4 million short tons of in-place coal over the Continuation of Current Management Alternative as available for further leasing consideration

Impacts from Coal Unsuitability Recommendations. Identifying 14,100 acres of public minerals as unsuitable for further coal leasing would eliminate estimated 185.5 million short tons in-place from leasing. The impact of eliminating both the Colorado River corridor (4,100 acre) and the Palisade municipal watershed (10,000 acres) from further leasing would be low. Coal companies would have difficulties removing the coal beneath the Colorado River. Only one coal company with a lease on a portion of the Palisade municipal watershed has expressed any interest in additional leasing. The leases in this area have an estimated 40 years of reserves based on present production levels from the company producing in the area.

Allowing coal surface facilities in the Colorado River corridor would make it possible for adjacent coal lands to be developed.

Impacts from Oil and Gas Management. Leasing and subsequent development of oil and gas in

the same areas identified as acceptable for further coal leasing consideration (350,389 acres) could reduce considerably the amount of coal available for mining. The amount of coal unavailable for mining would depend on various unknown factors, such as the scope and timing of development of both resources and the amount of coal required to be left as pillars around existing oil and gas wells. No projections on coal loss around oil and gas wells have been made for coal leasing areas. However, a conflict could exist between coal and oil and gas if sufficient amounts of coal were required to be left in-place so as to make the area uneconomical to mine. Any conflict would be resolved prior to coal leasing.

Developing ten applications for permit to drill (APDs) and 23 projected wells in the Little Book Cliffs area would have the following impacts: All ten APDs are located within the area found acceptable for further coal leasing consideration under this alternative. Therefore, the ten pending APDs and the 23 projected APDs would conflict with coal development because a pillar of coal would have to be left around each producing well during simultaneous development of coal and oil and gas. The amount of coal left around each well would vary considerably depending upon the method of calculation. The Bureau of Mines requires a 150-foot-radius (300-foot-square pillar) of coal left around each producing well. For each producing well this would result in an average coal loss of 29,000 tons of in-place coal, or 290,000 tons of in-place coal for the ten pending APDs and 667,000 tons for the 23 projected wells for a total loss of 954,000 tons of in-place coal. This loss would be minor. The Colorado Mined Land and Reclamation Board might require using a 21 degree angle of draw from the coal bed to the surface. Using this method, each producing well would result in an average loss of in-place coal of 480,000 tons per well, or 4,320,000 tons for the ten pending APDs and 11,040,000 tons for the 23 projected wells for a total loss of in-place coal of 15,360,000 tons. This would be a high impact and might result in the area being uneconomical to mine.

Developing 33 projected wells in the Demaree Canyon WSA would result in the following impacts: Leaving coal around producing wells as required by the Bureau of Mines could result in the loss of 57,000 tons of in-place coal. Using the possible requirements of the Colorado Mined Land and Reclamation Board, the resultant loss would be 15,840,000 tons of in-place coal. The Colorado Mined Land and Reclamation Board method would be a high impact that might result in the area being uneconomical to mine.

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IMPACTS ON OIL AND GAS

Impacts from Proposed Management Actions

Impacts from Oil and Gas Management. Table 4-4 lists the development potential within each leasing category.

Making approximately 624,701 acres available for lease with only standard lease terms would allow exploration and development with few restrictions. Compared with the Continuation of Current Management Alternative, approximately 16,358 more acres (3 percent increase) would be available for leasing with standard stipulations only.

Closure of about 18,835 acres with moderate development potential would result in lost rental revenues and foregoing of resources; however, it is much less likely that development activities would occur on these lands than on high potential lands. Closure of approximately 130,252 acres with low development potential might result in loss of rental income; however, it is unlikely that these lands would be applied for or that any development would occur as the areas are not considered to be prospectively valuable for oil and gas. Compared with the Continuation of Current Management Alternative, an additional 37,249 acres (34 percent increase) would be closed to leasing. Also, compared with the Continuation of Current Management Alternative, approximately 30,121 fewer acres would be closed to leasing on lands with high development potential, while an additional 7,480 acres with moderate potential and 59,890 acres with low potential would be closed.

Making approximately 63,100 acres with high development potential and 50,115 acres with moderate development potential available for lease with the no surface occupancy (NSO) stipulation would result in higher drilling and development costs, as directional drilling would be necessary. High drilling and development costs might result in limited activity and foregoing of some oil and gas reserves. Making approximately 18,125 acres with low development potential available for lease with the NSO stipulation would have little effect as it is unlikely that any development would occur on these lands. Compared with the Continuation of Current Management Alternative, approximately 87,901 additional acres (202 percent increase) would be subject to the NSO stipulation. Of this acreage, approximately 41,965 acres have high development potential, 36,378 acres have moderate potential, and 9,558 acres have low potential.

Making approximately 394,011 acres of high and 77,838 acres of moderate development potential lands available for leasing with other stipulations

might result in some higher costs and scheduling inconveniences for development projects but probably would not result in foregoing oil and gas reserves. Making approximately 82,414 acres with low development potential available for lease with other stipulations would probably not affect development as it is unlikely that such projects would occur. Compared with the Continuation of Current Management Alternative, an additional 115,931 acres (26 percent increase) would be subject to other stipulations. Of this acreage, approximately 23,495 acres have high development potential, 44,728 acres have moderate potential, and 47,708 acres have low potential.

Impacts from Coal Management. Mining of coal might result in delays in drilling schedules, higher drilling and development costs, and the use of special techniques or alternate drill sites. Mining might also damage existing wells. If the potential gas producing zone is a minable coal bed, mining might remove or reduce the gas resources.

IMPACTS ON MINERAL MATERIALS

Impacts from Proposed Management Actions

Impacts from Mineral Materials Management. Identifying 1,171,215 acres as open would make that acreage available for mineral materials sale or free use permits. This would allow companies or individuals to submit applications for removal of mineral materials on 80 percent of the resource area.

Continuing to close 6,188 acres and closing an additional 282,988 acres would eliminate a total of 288,176 acres from consideration. Compared with the Continuation of Current Management Alternative, an additional 184,350 acres would be closed. This would be a moderate impact because of the large amount of land involved. However, large amounts of mineral materials would be available in other parts of the resource area. Closure could be significant for isolated site-specific areas.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Paleontological Resource Management. Impacts would be the same as under the Continuation of Current Management Alternative with one exception, that being designation of the Fruita and Rabbit Valley paleontological sites as research natural areas (RNAs). This would give these

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Table 4-4. Development Potential by Leasing Categories

Impacting Resources Listed by Lease Category	Oil and Gas Development Potential (Acres)			
	High	Moderate	Low	Total
No Leasing	0	18,835	130,252	149,087
Leasing with Stipulations:				
No Surface Occupancy	63,100	50,115	18,125	131,340
Other Stipulations	394,011	77,838	82,414	554,263
Standard Lease Terms				624,701

Note: Table 2-6, Chapter 2, identifies oil and gas leasing restrictions by resource concerns and by alternative.

sites the greatest degree of protection from surface disturbance and destruction of the fossil resources.

Impacts from Oil and Gas, Mineral Materials, and Public Utilities Management. Designating the Rabbit Valley paleontological site as sensitive to oil and gas activities and no surface occupancy on the Fruita Paleontological Site would aid in decreasing the chances of fossil destruction, as would elimination of public utilities from both areas. Closing these sites to mineral material removal would also provide a high degree of protection to fossil resources.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle use to designated roads and trails at the Rabbit Valley paleontological site and continuing the closure to off-road vehicle use at the Fruita Paleontological Site would increase the amount of protection to fossil resources in these areas.

Impacts from Wilderness Management. Although wilderness designation offers protection to fossil values by preventing surface-disturbing activities, many times fossils are found through surveys prior to surface activities or during field work. Wilderness designation would prevent this in four wilderness study areas. Also, when fossils are found within the wilderness areas, stipulations to protect wilderness values would preclude quarries and make transport of large fossils difficult.

Cumulative Impacts on Paleontological Resources

Surveys in Class I areas and implementation of the Rabbit Valley Paleontological Management Plan would significantly reduce the incidence of fossil destruction, as would elimination of public utilities and mineral material removal from the area. However, leaving the area open to off-road vehicle use would increase the probability of destruction of fossils on or near the surface and would limit the effectiveness of management actions. Designation of the Fruita and Rabbit Valley sites as RNAs and limiting off-road vehicle access to designated roads

and trails would give more protection to fossil resources than under the Continuation of Current Management Alternative.

Wilderness designation would generally protect fossil values in four wilderness study areas, although the opportunities to find new fossil sites may be diminished and excavation not allowed.

IMPACTS ON FORESTRY

Impacts from Proposed Management Actions

Impacts from Forest Management. Management of 111,244 acres of productive pinyon-juniper woodland (83 percent of the woodland base) would result in 200 additional cords of fuelwood being harvested per year (2,800 cords/year total). Managing 1,319 acres of primarily ponderosa pine commercial forest land would increase sawtimber available for future harvesting. Impacts from silvicultural practices would be the same as those discussed under the Continuation of Current Management Alternative.

Impacts from Water Resources Management. Closure of the Grand Junction and Palisade municipal watersheds to timber harvest would remove 955 acres of productive pinyon-juniper woodland from the woodland base. The harvest level would not be significantly reduced.

Impacts from Locatable Minerals and Oil and Gas Management. Locatable minerals development could destroy the forest resource in areas where they overlap. Uranium mining could reduce the amount of pinyon-juniper under management by as much as 25 percent in some areas. Much of this loss would begin to be recovered in 25 to 35 years.

Oil and gas activity would cause the annual loss of 70 acres of forest land. This land would be out of production for up to 60 years for a producing well and 30 years for a dry hole. The ten pending APDs in the Little Book Cliffs area, the 23 projected

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wells in the Little Book Cliffs Wilderness Study Area, and the 33 projected wells in Demaree Canyon Wilderness Study Area are included in this acreage. This development would result in no significant impacts.

Development of nine applications for permit to drill (APDs) in the Little Book Cliffs Wilderness Study Area and one APD in the wild horse range would have no significant impact on woodland or timber harvests.

Impacts from Wildlife Management. Designing fuelwood and timber sales to meet wildlife needs for edge and cover throughout the resource area would have no significant impact on harvest levels. Stipulations to protect elk calving areas and critical big game range would not significantly reduce fuelwood or timber harvests. Limiting fuelwood sales west of Big Salt Creek to green wood sales and closing the entire Grand Valley to wood cutting would cause no significant impact on harvest levels.

Impacts from Livestock Grazing Management. Maintenance of the existing chainings (done in the 1960s) would result in the permanent loss of approximately 9,000 acres of productive pinyon-juniper woodland, with a large percentage of this area having some of the highest production potential in the resource area.

Impacts from Wild Horse Management. Impacts would be the same as those discussed under the Continuation of Current Management Alternative.

Impacts from Wilderness Management. Designating Dominguez Canyon, Sewerup Mesa, Black Ridge Canyons, and Black Ridge Canyons West as suitable for wilderness would result in the permanent loss of 17,529 acres of productive pinyon-juniper woodland and 545 acres of commercial forest land in the Grand Junction Resource Area. This includes approximately 2,762 acres of productive pinyon-juniper woodland in the Uncompahgre Resource Area (Montrose District) would also be lost. This represents 12 percent of the productive pinyon-juniper woodland in the Grand Junction Resource Area.

Impacts from Transportation Management. Developing roads in forest and woodland areas would benefit forest management by reducing administrative costs associated with access.

Impacts from Fire Management. Designating fire management areas would reduce fuel sources that increase the chances of catastrophic fires and potential loss of productive forest and woodland.

Cumulative Impacts on Forestry

Managing approximately 112,563 acres of forest land (20 percent of the forest base) would provide for an annual harvest of 2,800 cords of fuelwood and a minor amount of sawtimber. Other impacts would be the same as those discussed under the Continuation of Current Management Alternative.

IMPACTS ON WILDLIFE

Impacts from Proposed Management Actions

Impacts from Wildlife Management. Developing habitat management plans with the assistance of the Colorado Division of Wildlife would assist each agency in meeting forage production and wildlife population goals. Deer and elk would be managed as key species on 75 percent of the resource area, a 10 percent increase over that in the Continuation of Current Management Alternative. Deer and elk use of the public land could increase by up to 24 percent.

Placing 101,595 acres in a sensitive to coal leasing category (see Appendix D) would protect critical deer and elk winter range through stipulations developed at time of lease. Forage improvement projects along with stipulations protecting the remaining critical big game winter range would help Colorado Division of Wildlife to meet its population goals, and a 14 percent increase in AUMs would be attained. The habitat improvements and Colorado Division of Wildlife actions on the Uncompahgre Plateau would provide for an increase in the deer population of between 75 and 100 percent. Site-specific impacts from increasing forage production by the various methods listed in Appendix B would be analyzed in the habitat management plans.

Maintaining fruit-producing stands of mountain shrubs would provide improved habitat and food sources for many species of wildlife. Leaving 30 percent of the sagebrush that may exist in a treatment site would help to maintain populations of sagebrush dependent species.

Habitat management to maintain forage for big-horn sheep would allow each of the two reintroduced herds to reach a population of 100 animals by 1990. However, in the long term the wilderness designations in this alternative would provide more security to the two herds.

Stipulations protecting riparian vegetation on all perennial streams would reduce loss of this habitat and increase the amount in fair and good condition to 75 percent of the total (approximately 2,500

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acres). However, additional acres would be protected along rivers and ponds resulting in few impacts.

Providing land to establish a 30 to 60-acre wetland area would provide habitat for migratory water birds during periods when management of other water areas conflicts with the needs of waterfowl, shore and marsh birds. Stream habitat improvements (where needed) along 71 miles of fish stream would increase fish production by 50 to 200 percent. Since the fish potential on public land streams is not large compared to the potential on streams of forest and private land, this impact would be modest.

Impacts from Threatened and Endangered Species Management. Limiting surface-disturbing activities to protect wintering bald eagles along the Colorado River below Fruita would also decrease harassment and poaching of the resident deer population during winter months and would help to maintain the herd, which represents two percent of the total population in the resource area.

Maintaining a larger prairie dog colony for benefit of the potential existence of black-footed ferrets would not only provide more food for raptors on the sensitive list but also for furbearers such as coyotes, badgers, and weasels. This would help to stabilize or even increase their populations. Since the area involved is close to Grand Junction the effect would be quickly noticed.

Impacts from Water Quality Management. Projects to reduce sediment and salinity in the Grand Valley would provide up to 200 acres of waterfowl resting area and nearly 2,500 waterfowl use days. Watershed treatments on 67,560 acres of watershed outside the Grand Valley would increase forage production and extend the waterfowl feeding and resting area. Sediment control structures on Calamity and Blue Creeks would enable fish production on these creeks and a minimum increase in production of 25 percent during the first 15 years. Stream stabilization and improvement projects in Big and East Salt Creeks and Dominguez Creek would extend fisheries potential and increase production in Dominguez Creek by 30 pounds per acre. Protecting the Grand Junction municipal watershed from surface disturbance would help to maintain the productivity of 1,240 acres of critical deer and elk winter range.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Loss of riparian and other wildlife habitat to locatable or salable mineral development would be about 6 percent less than under the Continuation of Current Management Alternative. The areas designated unsuitable for coal leasing would protect about 1,600 acres of critical deer winter range in the Palisade watershed and 200 acres of riparian habitat along

the Colorado River. Stipulations restricting surface disturbance or occupancy would protect 400 acres of elk calving grounds and reduce calf losses.

Seasonal stipulations for deer, elk (and elk calving areas), and bighorn sheep habitat would reduce harassment and poaching of animals and also assist in meeting Colorado Division of Wildlife big game population games.

Resident and migratory species of high interest could be adversely affected by coal development. These impacts would be analyzed in a regional coal environmental impact statement prior to leasing.

Development of ten pending applications for permit to drill (APDs) in the Little Book Cliffs area would cause the removal of 78 acres of forage usable by wildlife (85 AUMs) and increase wildlife harassment (mainly wintering deer) through increasing public vehicular access by 10 miles of road over the next 20 years. The drilling of 23 projected gas wells in the Little Book Cliffs WSA would cause the loss from forage production of 176 acres (195 AUMs) and increase wildlife harassment through the addition of 23 miles of road over the next 20 years. The drilling of 33 projected gas wells in the Demaree Canyon WSA would result in a reduction of forage producing area by 249 acres (280 AUMs) and increase in harassment of wildlife along 33 miles of road over the next 20 years.

Impacts from Forest Management. Managing the timber and woodland resources to consider wildlife needs would help to improve habitat and forage production for most wildlife species. The significance of this impact would be moderate within the next 20 years but would accumulate to a major beneficial impact over a generation. Harvesting of timber and aspen on 1,319 acres of commercial forest land at or below sustained yield would improve the habitat, cover, and food for game and nongame species dependent on these areas.

Impacts from Wild Horse Management. Limiting herd size to a maximum of 120 horses would allow almost 10 percent of the critical deer winter range in the resource area to improve as wildlife habitat.

Impacts from Recreation Management. Increases in the number and acreage of intensive recreation management areas would further reduce harassment of big game. The increase in areas closed to off-road vehicles, limited to existing roads and trails, or having seasonal closures would also reduce stress on wildlife and help to increase wildlife populations. This would be particularly beneficial on pronghorn antelope ranges south of Kannah Creek and at the west end of the Grand Valley.

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Impacts from Wilderness Management. Wilderness designation of the Black Ridge Canyons, Black Ridge Canyons West, Dominguez Canyon, and Sewemup Mesa would increase habitat and protection from harassment of both big game and nongame species of wildlife. Increases in forage production through vegetation manipulation on up to 600 acres of pinyon-juniper woodland would possibly be determined irreconcilable with wilderness management resulting in a potential loss of 667 AUMs over 20 years, which would be a minor effect. Placing restrictions on water developments might be so inconvenient to the point of not developing them. However, this would occur only if the expected benefits to wildlife were minor.

Impacts from Special Management Areas. Designation of 1,470 acres in Rough Canyon as a special management area would protect approximately 400 acres of critical deer winter range.

Impacts from Land Tenure Adjustments. Land identified for disposal would include approximately 2,000 acres of critical winter range for deer or elk, 2,300 acres of deer and elk summer range, 780 acres of pronghorn range, 1,000 acres of prime early fall bear habitat, 2,600 acres of wild turkey range, 200 acres of public pheasant habitat, and 1,000 acres in parcels which contain riparian and aquatic habitat. The percent of the total in every case would be relatively small, from 5 to less than 1 percent.

Impacts from Transportation and Public Utilities Management. Acquiring 64 miles of road for public access would improve habitat management but would also increase harassment and poaching of big game. The possible closing of approximately 170 miles of existing road would increase forage production but, more importantly, would reduce harassment and poaching of big game.

Designating 1,280 acres on Skipper's Island, Island Acres, and the Highline Recreation Area as unsuitable for public utilities would prevent a potential loss of up to 50 waterfowl per year through collisions with power lines. Unsuitable designations in areas of Granite Creek, the slopes of Grand Mesa, and the Grand Junction watershed would protect 13,210 acres of critical deer and elk winter range from disturbance by maintenance or construction activities associated with public utilities. Approximately 225,610 acres of critical big game winter range would be designated as sensitive, with several stipulations protecting wildlife from harassment during critical periods. Stipulations would protect almost 2,500 acres of riparian area from surface disturbance.

Cumulative Impacts on Wildlife Resources

Deer and elk would be managed as key species in 75 percent of the resource area, wildlife forage production would be increased, and Colorado Division of Wildlife population goals would be met. Protective stipulations and special management areas would reduce harassment of big game on critical winter range from that under the Continuation of Current Management Alternative and protect riparian habitat. An increase in intensive recreation management areas and limitations placed on vehicle use would further help to reduce harassment and poaching of big game. Salinity and sediment control projects would increase waterfowl resting areas and improve fish habitat. Nondesignation of Demaree Canyon and Little Book Cliffs WSAs would result in the loss of 286 acres of forage production on critical deer winter range. The single most effective measure to keep riparian habitat remains the stricture of no surface disturbance within 100 feet of perennial streams.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Impacts from Proposed Management Actions

Impacts from Threatened and Endangered Species Management. Applying stipulations to all known locations and areas (sites) with a very high potential for existence of threatened and endangered species would guard against adverse impacts to threatened and endangered species, their habitat, or their ability to maintain or increase in population. Chapter 3 lists the threatened and endangered species in this resource area. Chapter 3 also provides information on the status of these species, thus indicating the significance of actions that may affect the species.

Improving 4.3 miles of Colorado River cutthroat trout habitat would help to maintain the population of this fish.

This alternative directs that only two habitat management plans (HMPs) be prepared that choose threatened and endangered species as the key management species. These HMP areas are Pyramid Rock and Horsethief/Ruby Canyons. Key species would include the bald eagle, Colorado River squawfish, humpback chub, razorback sucker, and Uinta Basin hookless cactus.

Continuing to cooperate with the Colorado Division of Wildlife in the peregrine falcon recovery project would increase the chances of establishing a self-sustaining population.

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Impacts from Water Resources Management.

Limiting surface disturbance in the Palisade municipal watershed would help maintain riparian habitat for the Lewis' woodpecker, yellow-billed cuckoo, and prey species for peregrine falcons.

Watershed projects on Leach Creek, Hunter, Big Salt, and East Salt Washes would improve the habitat for prey species of sensitive raptors nesting along the Book Cliffs. Continuing management of the Badger Wash paired watersheds would maintain 170 acres of habitat for *Cryptantha elata* (sensitive) and the unique Gardner's saltbush/salina wildrye plant community. In addition, watershed improvement projects on 67,560 acres would increase prey for sensitive raptor species.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Maintaining existing withdrawals (primarily placer) on 36,300 acres along rivers or streams would help protect this important habitat for bald eagles. Closing 3,120 acres in Badger Wash to mineral entry would help protect *Cryptantha elata* and the Gardner's saltbush/salina wildrye plant community. Removing two sites from mineral sales would protect habitat for the sensitive Great Basin silverspot butterfly, the plant *Phacelia submutica*, and the threatened Uinta Basin hookless cactus.

Coal unsuitability criteria would not protect sensitive plant species, in particular the musinea milk-vetch.

Applying No Surface Occupancy, No Surface Disturbance, and seasonal stipulations to oil and gas development including ten pending applications for permit to drill in the Little Book Cliffs area would help protect threatened and endangered species. In addition, this alternative would remove acreage from mineral entry in three potential wilderness areas and Ruby Canyon would provide greater protection from disturbance of potential sites or habitat for sensitive, threatened, and endangered species.

Impacts from Forest Management. Prohibiting wood harvest in wooded riparian areas would help to maintain habitat for bald eagles and other sensitive species. Identifying 39,105 acres of conifers and aspen as unsuitable for management pending completion of timber production capability classification would help to maintain habitat for raptors, notably the flammulated owl, a migratory species of high federal interest. This alternative would design harvests to protect sensitive, threatened, and endangered species, and this would help to increase the food base or habitat for the species.

Impacts from Wildlife Management. Increasing forage production to help increase big game and waterfowl populations would increase the carrion food base for bald eagles, providing support for an

additional 10 birds. Protecting riparian habitat would help maintain important habitat for bald eagles and for sensitive species, including the great blue heron, black-crowned night heron, yellow-billed cuckoo, and the Lewis' woodpecker. Maintaining ponderosa pine seed trees and snags for wild turkey would also provide habitat for the Lewis' woodpecker.

Impacts from Cultural Resource Management.

Limiting surface disturbance in Cactus Park would help to protect 80 acres containing a sparse population of spineless hedgehog cactus.

Impacts from Recreation Resource Management.

Management of two intensive recreation management areas would help to reduce the impact on threatened and endangered plants by centralizing the more intensive recreation uses. However, the Grand Valley Intensive Recreation Management Area could adversely affect habitat for the sensitive plant *Cryptantha elata* and sensitive animals such as the kit fox, Scott's oriole, and the leopard lizard. Designating one additional intensive recreation management area would help to limit potential disturbance of sensitive or threatened and endangered species.

Impacts from Off-Road Vehicle Management.

Increasing the areas closed to off-road vehicle travel by 141,725 acres and those limited to existing roads by 336,159 acres would help to protect not only pronghorn antelope but also the potential habitat for black-footed ferret and *Cryptantha elata*.

Impacts from Visual Resource Management

(VRM). Designating VRM Class I (154,560 acres) and II (106,520 acres) areas would increase the area and protection for listed species.

Impacts from Wilderness Management.

Designating four wilderness study areas as wilderness would help protect potential habitat and populations of sensitive and threatened and endangered species, including peregrine falcon nest sites and bald eagle concentration areas.

Designating the three wilderness study areas as wilderness would, however, limit mechanized treatment for habitat improvement and thus reduce potential improvement in populations as a result of such treatment.

Impacts from Special Areas Management.

Maintaining the Unawep Seep as a research natural area would protect habitat for one of three Colorado colonies of a sensitive species of butterfly. Designating 470 acres around Pyramid Rock and Rough Canyon as research natural areas would provide increased protection to sensitive and threatened and endangered species in these areas.

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Impacts from Land Tenure Adjustment. Disposing of Skipper's Island would potentially reduce critical riparian habitat and resting areas for bald eagles and other sensitive species.

Impacts from Public Utilities Management. This alternative would designate Ruby Canyon and the Gunnison and Dolores Rivers as sensitive to public utilities development, and this would reduce river crossings of power lines thus decreasing the potential for bald eagle mortalities caused by collisions with the power lines. In addition, designating all riparian areas as sensitive or unsuitable would protect the areas most critical to bald eagles and other species requiring riparian habitat.

Cumulative Impacts on Threatened and Endangered Species

Management actions would generally increase protection for threatened and endangered and sensitive species over that of the Continuation of Current Management Alternative. Designating three wilderness study areas as wilderness, closing an additional 141,725 acres to off-road vehicle travel, designating VRM Class I and II areas, and protecting riparian habitat from surface disturbance would help to improve habitat and potential for increasing threatened and endangered populations.

IMPACTS ON WILD HORSES

Impacts from Proposed Management Actions

Impacts from Wild Horse Management. Continuing to manage the wild horses as outlined in the Little Book Cliffs Wild Horse Management Plan would result in a viable horse herd.

Impacts from Coal Development. Development of existing coal leases would have a minor impact on the critical wintering and foaling areas in Coal Canyon. Identifying the remaining area as suitable pending further study and mitigating any adverse impacts from potential coal development prior to lease issuance would ensure a viable horse herd is maintained.

Impacts from Oil and Gas Management. Development of existing leases in the Little Book Cliffs area would detract from the natural character of the horse range but would not significantly impact the herd. This is because nine of the ten pending APDs (see Appendix E) are outside the horse range and the tenth pending APD and the 23 projected APDs would have seasonal stipulations placed on them as a condition of APD approval.

Placing 30,261 acres (the existing wild horse range and the proposed addition) in the Other Stipulations leasing category (Table 2-6) would help protect the horses.

Impacts from Forest Management. Limiting fuelwood sales to commercial sales of 30 acres or less would decrease harassment and help to increase available forage.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle (ORV) use to existing roads and trails would help to improve forage production and habitat and decrease harassment of the horse herd. Seasonal closure of Coal Canyon would protect the horses during their critical foaling period. The addition of another 150 acres of private land would legalize the use that is already occurring there.

Impacts from Land Tenure Adjustment. Impacts would be the same as those discussed under the Commodity Alternative.

Impacts from Transportation and Public Utility Management. Designating Coal Canyon as a utility corridor for power lines would detract from the natural character of the area.

Cumulative Impacts on Wild Horses

Seasonal closure of Coal Canyon to general public use and to oil and gas drilling would give greater protection to the horse herd during critical winter and foaling periods. Sediment control structures in Jerry Gulch and Coal Canyon would potentially increase forage by 20 AUMs in critical horse winter range. Access acquisition to Adobe and Carpenter trails would improve management of the herd through more rapid access, and add to the recreational opportunities in the area. Adding the additional acreage to the horse area would ensure that all of the area the horses are presently using is within the horse area. Acquiring the private land within the horse area would allow a hazardous barbed wire fence to be removed and a valuable spring to be developed.

IMPACTS ON CULTURAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Cultural Resource Management. Active management of eight high value areas would increase the type and amount of information available for interpretive use and contribute to an understanding of prehistoric and historic cultures in the resource area. The high value areas are Ladder

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Springs, Sieber Canyon, Dead Indian site, Rough Canyon, Cactus Park, McDonald Creek, Indian Creek, and the Sinbad Valley historic project unit. Additional cultural site data would be acquired as a result of clearances for other surface-disturbing activities. Eligible high value sites would be nominated to the National Register. The remaining 154 known high value sites and 141 moderate value sites would not be actively managed. No protective measures would be taken to reduce the effects of natural deterioration or vandalism.

Impacts from Recreation Management. Stipulations limiting recreational activities to designated areas of Rough Canyon, Bang's Canyon, The Palisade, and on the Gunnison Gravels would provide additional protection to cultural sites in those areas. The addition of 123,520 acres as intensive recreation management areas would potentially increase vandalism to high value sites that may be located in those areas.

Impacts from Off-Road Vehicle Management. The closure of an additional 141,725 acres to off-road vehicle use would further decrease vandalism to cultural sites in the resource area. The large increase in acreage (956,520 acres) where off-road vehicle use is limited to existing roads and trails would not, however, appreciably reduce vandalism to cultural sites.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Activities associated with mineral development would continue to create the greatest potential for site destruction, vandalism, and unauthorized collection of artifacts.

Cumulative Impacts on Cultural Resources

Actively managing five additional high value sites would significantly add to understanding of prehistoric cultures in the resource area and provide more opportunity for cultural site interpretation benefiting the public. The additional acreage included in the intensive recreation management areas would potentially increase the vandalism to high value sites in localized areas. Vandalism and site destruction from mineral development activities would have a large adverse impact on cultural resources.

A no surface occupancy category designation for high value areas would increase the potential for scientifically oriented research over salvage initiated work in these areas.

IMPACTS ON RECREATION RESOURCES

Impacts from Proposed Management Actions

Impacts from Recreation Management. Managing three IRMAs (see Chapter 2, Summary of Management Action, for description and location), would protect scenic values and increase recreational opportunities in these areas. Maintaining ROS settings would also protect recreational values in the Mount Garfield area, the Palisade area, Hunter/Garvey Canyons, Sinbad Valley, Granite Creek, and the Dolores, Gunnison, and Colorado River corridors. Providing for group use in Cactus Park and Rabbit Valley would increase recreational opportunities in these two places. Managing Ruby Canyon to protect scenic values, requiring permits for commercial and private use, and improving the Loma launch site would reduce degradation of a high quality recreational area. Expanding group use capacity at Mud Springs and requiring permits for overnight camping and group use would increase recreational opportunity and improve management of this recreation site.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Withdrawing 149,440 acres for wilderness and Ruby Canyon from mineral entry would protect highly scenic recreation settings from degradation. Oil and gas development in the remainder of the resource area would continue to degrade recreation settings. Developing 10 pending and 23 projected applications for permit to drill (APDs) in the Little Book Cliffs area and 33 projected APDs in the Demaree Canyon WSA would have little additional impact over that discussed above.

Impacts from Forest Management. Restricting fuelwood and sawtimber harvest in Bang's Canyon/Northeast Creek, Sinbad Valley, Granite Creek, The Palisade, and South Shale Ridge, and prohibiting harvest in the wilderness areas would protect recreational values in these areas. Continuing fuelwood and sawtimber harvest in the remainder of the areas would result in a degradation of recreation settings.

Impacts from Wildlife Management. Wildlife management proposals would improve wildlife related recreation opportunities (hunting, viewing, and fishing) and provide some protection to important recreation settings. Wildlife impacts would be more beneficial than those in the Continuation of Current Management Alternative.

Impacts from Threatened and Endangered Species Management. Management for threatened and endangered species would provide pro-

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tection to important recreation settings and opportunities.

Impacts from Visual Resource Management (VRM). Increasing VRM Class I designations would protect several high quality recreation settings from degradation, primarily the wilderness areas, cliffs in Sinbad Valley, The Palisade, and Mount Garfield. Designation of other important visual resource as either VRM Class II or III in other parts of the resource area would provide a critical need in ensuring continued availability of high quality recreation settings and opportunities.

Impacts from Off-Road Vehicle (ORV) Management. Increasing the acreages closed to ORVs and in which use is limited to existing roads, and seasonal closures protecting critical wildlife range would reduce degradation of recreational settings and increase the diversity of recreational opportunities.

Impacts from Wilderness Management. Designating four areas as wilderness would protect high quality primitive settings from degradation in those areas and provide for primitive recreational activities. Motorized recreation would be lost in four WSAs.

Impacts from Special Areas Management. Designating The Palisade as an outstanding natural area (1920 acres) would protect this high value landscape feature. The Palisade is a dominant scenic feature that contributes strongly to the quality of the recreation setting in this area.

Impacts from Land Tenure Adjustments. Disposing of public land on Whitewater Hill and in Lower Devil's, Flume, and Pollack Canyons might eliminate public recreation opportunities in these areas.

Impacts from Transportation Management. Acquiring access to large blocks of public land in the Roan Creek drainage and the Book Cliffs would greatly increase and improve recreation opportunities in these areas.

Impacts from Public Utilities Management. Increasing the area unsuitable for public utilities by 76,743 acres (in addition to exclusion from the wilderness areas) would help to maintain important recreation settings and values.

Impacts from Fire Management. Limited fire suppression would occur in the wilderness areas, helping to maintain a natural recreation setting. Suppressing fires in the remainder of the resource area would reduce the opportunities to develop more natural settings where fire occurs.

Cumulative Impacts on Recreation Resources

Recreation opportunities would be expanded and important high quality areas protected under this alternative. Wilderness areas would increase the protection and availability of high quality recreation settings, as would increasing the area protected by VRM Class I designation. Closing areas to cross-country ORV use and acquiring access to large blocks of public land would reduce the degradation of recreational settings and increase the opportunities for various types of outdoor recreation.

IMPACTS ON OFF-ROAD VEHICLES

Impacts from Proposed Management Actions

Impacts from Off-Road Vehicle Management. Continuing competitive and intensive off-road vehicle use on 10,240 acres of desert land between 27-1/2 Road and the west flank of Mount Garfield (including the face of the Book Cliffs) would provide for off-road vehicle user demand in an area which presently has the heaviest use in the Grand Valley.

Impacts from Soils and Water Resources Management. Limiting off-road vehicle access in most of the Grand Valley to existing roads would reduce the cross-country ORV opportunities in the resource area. About 60 percent of the existing cross-country use in the Grand Valley occurs outside of the proposed open area between 27-1/4 Road and 32 Road.

Impacts from Wildlife Management. Seasonal closures of big game winter range would reduce winter off-road vehicle use in the wild horse range, the Beehive, Chalk Mountain, Land's End, Sunnyside, Big Salt Wash, Demaree Canyon, and Blue Mesa. Limiting off-road vehicle travel to existing roads in these areas during the remainder of the year would also decrease cross-country off-road vehicle use. Seasonal closures during harsh winters would further decrease off-road vehicle use in the Roan Creek drainage, Book Cliffs, Glade Park, and Gateway areas. Generally, the off-road vehicle demand in the above areas is very low during the winter months.

Impacts from Wild Horse Management. Limiting off-road vehicle use to designated roads in the wild horse range and seasonal closure of big game winter range in Coal Canyon would reduce the area and opportunity for off-road vehicle use. The proposed December 1 to June 30 seasonal closure in Coal Canyon occurs during the heaviest period of ORV demand and would eliminate about 4,500 visi-

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tor days of ORV use annually (about 65 percent of the use) in the Coal Canyon area.

Impacts from Recreation Resource Management. Limiting off-road vehicle use to existing roads in the following areas would decrease the areas and opportunity for cross-country vehicle use: The Palisade, Dolores and Colorado River corridors, Sinbad and Rabbit Valleys, Hunter/Garvey Canyons, the south slope of Battlement Mesa, Bang's Canyon, Cactus Park, South Shale Ridge, the Little Book Cliffs Wild Horse Range, Granite Creek, and highly scenic portions of the Grand Valley (the cliffs east of Mount Garfield and the slopes of the Grand Mesa). Significant amounts of ORV use occur in the area around The Palisade (1,000 visitor days per year) and in Rabbit Valley (500 visitor days per year). In the remainder of these areas, cross-country ORV use is minimal.

Impacts from Visual Resource Management. Closing 1,280 acres on Mount Garfield to off-road vehicle use would reduce the opportunities for off-road vehicle users in the Grand Valley and would shift hill climb activity to the adjacent areas open to off-road vehicles.

Impacts from Wilderness Management. Designating four wilderness study areas as wilderness areas would close them to off-road vehicle use and decrease the area and opportunity available for off-road vehicle users. Present ORV demand is low in the Black Ridge Canyons and Dominguez Canyon Wilderness Study Areas and nonexistent in the Sewernup Mesa Wilderness Study Area.

Impacts from Land Tenure Adjustments. Identifying public land tracts in Lower Flume, Devil's, and Pollack Canyons, Whitewater Hill, and other areas of the Grand Valley would not affect their availability for off-road vehicle use pending disposal. After disposal, these areas would no longer be under BLM control and may or may not be available for off-road vehicle use.

Cumulative Impacts on Off-Road Vehicle Management

Under this alternative, a large percentage of the resource area would be closed, limited to existing roads, or have seasonal closures applied to off-road vehicle use, thereby reducing the acreage available for cross country vehicle access and opportunity. Off-road vehicle use in the Grand Valley would change dramatically through changes in use patterns from closures on Mount Garfield, limiting off-road vehicle use to existing roads in much of the area, and through identification of areas available for intensive cross-country use.

The changes in ORV use would primarily restrict cross-country use of vehicles across public land. Virtually all existing roads would remain open. The magnitude of change in off-road vehicle use practices is dramatic, particularly because there are so few existing restrictions.

IMPACTS ON VISUAL RESOURCES

Impacts from Proposed Management Actions

Impacts from Visual Resource Management (VRM). Managing the cliffs in Sinbad Valley (1,920 acres) and Mount Garfield (1,280 acres) as VRM Class I areas would protect the quality of these highly scenic visual resources. Designating The Palisade (1,920 acres) as an outstanding natural area and managing it under VRM Class I would also provide protection to this high quality visual resource. Managing another 287,354 acres as VRM Class II and III would help to maintain other visual resources in the resource area. The remaining 65 percent of the resource area (838,499 acres) would have no VRM class designations.

Impacts from Locatable Minerals, Mineral Materials, Coal, and Oil and Gas Management. Developing oil and gas in the Book Cliffs area, Roan Cliffs, De Beque cutoff, the Collbran valley, and the slopes of Grand Mesa would continue to degrade visual resources and scenic quality in these areas. Developing coal along the face of the Book Cliffs, uranium in the Gateway area, and oil shale in the Roan Creek area would also result in degradation of high quality visual resources. Visual resource management class designations in some of the above mentioned areas would provide limited protection to these visually important areas.

Impacts from Forest Management. Modifying forest management practices in Bang's Canyon, Granite Creek, Sinbad Valley, and Hunter/Garvey Canyons would help to maintain the important visual resources of these areas. Managing forest resources in the remainder of the area would continue to adversely affect visual resources.

Impacts from Wildlife and Threatened and Endangered Species Management. Protection of wildlife habitat and threatened and endangered species through special stipulations would complement visual resource management objectives.

Impacts from Recreation Management. Designating intensive recreation management areas in the Grand Valley and Gateway areas would provide protection for scenic visual resources in those areas. Managing Granite Creek, Bang's Canyon, South Shale Ridge, Hunter/Garvey Canyons,

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Sinbad Valley, and the Dolores, Colorado, and Gunnison Rivers under recreation opportunity spectrum (ROS) classes would complement visual resource management in these areas and help maintain the quality of visual resources. Withdrawing Ruby Canyon from mineral entry would provide protection for the high quality visual resources found here.

Impacts from Off-Road Vehicle Management. Limiting off-road vehicle use to designated roads (71,651 acres), existing roads (384,423 acres), and closing 159,627 acres to off-road vehicle use would help to maintain visual resources and scenic quality in a large part of the resource area.

Impacts from Wilderness Management. Designating 149,087 acres of wilderness as VRM Class I areas would maintain the high quality visual resources in those areas.

Impacts from Public Utilities Management. Designating 268,100 acres as unsuitable to public utilities would protect visual resources from degradation in those areas. Modifying public utility routes, siting, or designs on 531,524 acres of land sensitive to public utilities would help to maintain visual quality in those areas.

Cumulative Impacts on Visual Resources

Visual resource quality would be maintained either completely (on 154,560 acres of VRM Class I areas) or in part (on 287,354 acres of VRM Class II and III areas) on approximately 35 percent of the resource area, including nearly 60 percent of the visual resources determined to be highly important. This compares to the Continuation of Current Management Alternative in which there is no VRM Class I designation and only 26 percent of the area has partial protection under VRM Class II and III designations.

IMPACTS ON WILDERNESS

Impacts from Proposed Management Actions

Impacts from Wilderness Management. Recommending four WSAs (Black Ridge Canyons—both units, Dominguez Canyon, and Sewemup Mesa) as suitable for wilderness would result in their designation as wilderness, assuming Congress would adopt these recommendations. Designation as wilderness would protect the wilderness characteristics of these four wilderness study areas and greatly expand the supply and diversity of wilderness in west central Colorado and the National Wilderness Preservation System.

Impacts from Air Quality Management. Managing four designated wilderness areas under Class II air quality standards would help maintain the area's naturalness and outstanding opportunities to experience solitude and primitive and unconfined recreation. Air quality in the Demaree Canyon and Little Book Cliffs WSAs may be diminished through mineral development. Air quality is not anticipated to change substantially in The Palisade WSA unless mineral development takes place.

Impacts from Water Quality Management. Impacts from the Sinbad Valley salinity project are the same as those discussed in the Continuation of Current Management Alternative for Sewemup Mesa WSA. A minimal impact is anticipated in 3 miles of stream channel stabilization in Bull Draw in The Palisade WSA.

Impacts from Locatable Minerals Management. Impacts to Demaree Canyon, Little Book Cliffs, and The Palisade would result in a loss of naturalness from road construction, prospecting, and mine development. Noise from these activities would lessen opportunities to experience outstanding solitude. Anticipated impacts are probably minimal because these WSAs have low locatable mineral potential. Black Ridge Canyons (both units), Dominguez Canyon, and Sewemup Mesa would be closed to mineral entry.

Impacts from Coal Management. Coal reserves exist in only the Demaree Canyon and Little Book Cliffs WSAs. Development of existing coal leases (Demaree Canyon—222 acres and Little Book Cliffs—1,934 acres) would impair their wilderness values. Existing leases are located on the periphery of these units; therefore, the major impacts would be in Zone 1 (see Figures 4-2 and 4-3). Further coal leasing in these WSAs would create new roads in these WSAs, modify their natural landscapes, and diminish opportunities to experience outstanding solitude and/or primitive and unconfined recreation. Over time, both Zones 1 and 2 would probably be so impacted that they no longer would possess wilderness potential.

Impacts from Oil and Gas Management. Development of oil and gas leases would be the most severe in the Demaree Canyon and Little Book Cliffs WSAs where the probability of development is high as evidenced by the areas being completely under oil and gas lease. BLM has estimated there will be 33 wells developed in the Demaree Canyon WSA and 31 wells developed in the Little Book Cliffs WSAs over the next 20 years. The resulting surface disturbance would segment these WSAs into parcels of less than 5,000 acres in size, disrupt naturalness and minimize opportunities to experience outstanding solitude and/or primitive and un-

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confined recreation. Special features in the Little Book Cliffs WSA would also be impaired.

Development of ten pending applications for permit to drill (APDs) in the Little Book Cliffs area would have the following impacts: Two of the APDs area outside of the Little Book Cliffs WSA and would have no impact on wilderness characteristics. Development of seven APDs in Zone 1 would directly impact about 62 acres and would eliminate this northern portion of Zone 1 from further wilderness consideration. This would constrain Congress' ability to designate the balance of the area as wilderness. One well in Zone 2 would impact about 9 acres and would be a major impact on the unit. Any development in Zone 2 incrementally lessens this core area from being manageable as wilderness. Further well development on the pre-FLPMA leases that make up more than 90 percent of Zone 2 could make the entire WSA unsuitable for wilderness designation.

The probability for oil and gas development is low in The Palisade, where a pre-FLPMA lease extends into the WSA and covers 120 acres. Overall, the impact from oil and gas development would be expected to be minimal. Prohibiting future oil and gas leasing and development in the Black Ridge Canyons (both units), Dominguez Canyon, and Sewemup Mesa WSAs would help preserve the areas' wilderness characteristics.

Impacts from Mineral Materials Management. Opening Demaree Canyon, Little Book Cliffs, and The Palisade to mineral material sales would result in a loss of naturalness in those areas. Closing Black Ridge Canyons, Dominguez Canyon, and Sewemup Mesa would help protect the wilderness characteristics of those areas.

Impacts from Forest Management. Impacts on naturalness from forest management would result in Demaree Canyon (937 acres), Little Book Cliffs (6,639 acres), and The Palisade (797 acres) in this alternative. Areas excluded from forest management would include Black Ridge Canyons (both units), Dominguez Canyon, and Sewemup Mesa. A total of 2,795 acres of productive pinyon-juniper woodland in the Dominguez Canyon WSA was excluded from the wilderness recommendation and would be impacted by forest management.

Impacts from Livestock Management. Motorized access where practical alternatives do not exist would be the primary impact in Black Ridge Canyons (both units), Dominguez Canyon and Sewemup Mesa.

Currently, there are no range projects proposed in Demaree Canyon, Little Book Cliffs, and The Palisade that would cause major impacts on naturalness. Continued motorized access in these areas

would decrease outstanding opportunities for solitude and primitive and unconfined recreation.

Impacts from Wild Horse Management. Impacts on opportunities for outstanding solitude would occur from the use of motorized equipment. Vehicle tracks and other surface disturbance would impact the naturalness of the area.

Impacts from Recreation Resource Management. Increased primitive recreation use in four newly designated wilderness areas (149,087 acres) would lessen their natural characteristics and diminish outstanding opportunities for solitude in some areas. Initially, preventing unauthorized off-road vehicle use near the boundaries of these areas could be a problem. These impacts would be mitigated through preparation and implementation of a wilderness management plan for each WSA.

Allowing motorboats to land on the south bank of the Colorado River in Ruby Canyon would have very little impact on the WSAs since this is the very edge of the proposed wilderness and the boats would be restricted to the shoreline. Other recreation impacts are discussed in the Off-Road Vehicles and Natural Areas sections. The limited off-road vehicle designation in The Palisade would shift the use from cross-country motorized use to more non-motorized recreational uses which would tend to protect naturalness.

Impacts from Off-Road Vehicle Management. Areas recommended for wilderness would all be closed to off-road vehicles thereby protecting wilderness values. The recommended Palisade Outstanding Natural Area (1,920 acres) would also be closed to ORVs. Having no new public roads in the Little Book Cliffs Wild Horse Range would also help protect natural values on about 18,000 acres of the Little Book Cliffs WSA.

The limited to existing roads designation on the balance of The Palisade WSA, Demaree Canyon WSA, and the Little Book Cliffs WSA outside the designated wild horse range (about 9,000 acres) would help to minimize impacts on naturalness, provided this can be enforced. Vehicles in these areas would still disrupt outstanding opportunities for solitude and primitive and unconfined recreation. New roads in these areas would increase this impact.

Impacts from Natural Areas Management. The Palisade's (1,920 acres) outstanding natural area designation would help to maintain the naturalness on part of this WSA and preserve geologic interpretive values. Demaree Canyon and Little Book Cliffs would not be designated as outstanding natural areas, and their naturalness would not be protected in this manner.

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Impacts from Land Tenure Adjustments. Acquisition of 320 acres of private land and 600 acres of state land (Colorado Division of Wildlife) would enhance the manageability of the Dominguez Canyon Wilderness Study Area. Both parcels of land are inholdings inside the wilderness study area.

Impacts from Public Utilities Management. Identifying the areas recommended for wilderness as unsuitable for utilities (149,087 acres) would protect wilderness values. The Palisade Outstanding Natural Area (1,920 acres) would also be unsuitable for public utilities. The impacts of identifying the Little Book Cliffs Wild Horse Range and Demaree Canyon WSA as sensitive would be the same as those described in the Commodity Alternative. These impacts would also occur in the Little Book Cliffs WSA outside the horse range and in The Palisade WSA outside the outstanding natural area which are identified as suitable for utilities.

Impacts from Fire Management. The use of mechanical equipment to suppress fires in Demaree Canyon, Little Book Cliffs, and The Palisade WSAs would impact the naturalness of these areas. Impacts to the recommended wilderness areas would be similar to those described in the Protection Alternative.

Cumulative Impacts on Wilderness Resources

Designation of the Black Ridge Canyons, Black Ridge Canyons West, Dominguez Canyon, and Sewemup Mesa WSAs (149,087 acres) as suitable for wilderness would permanently protect these areas' wilderness characteristics and perpetuate their natural ecosystems. These areas would be outstanding examples of the Colorado Plateau Ecotype and would add significantly to the acreage and variety of the National Wilderness Preservation System. The areas would help meet the needs of a growing regional demand for wilderness.

Nondesignation of the Demaree Canyon and the Little Book Cliffs WSAs would result in loss of wilderness potential due to mineral development as described in the Continuation of Current Management Alternative. The Palisade Outstanding Natural Area designation and the wild horse range where various restrictions are present would help prevent loss of naturalness and outstanding primitive recreation opportunities in these areas. Off-road vehicle restrictions in both The Palisade and the Little Book Cliffs Wild Horse Range would also help protect these areas' naturalness. Once released from wilderness review, oil and gas leasing in The Palisade could result in a further loss of natural values.

IMPACTS ON SOCIAL AND ECONOMIC CONDITIONS

Impacts from Proposed Management Actions

Impacts from Water Resource Management. Projects to reduce sediment yield and salinity would contribute to lower water treatment costs downstream. The anticipated salinity reduction of 3,300 to 11,000 tons per year would eventually reduce salinity costs in the lower Colorado River basin by \$185,000 to \$600,000 annually. Local benefits would result from increased soil productivity and reduced facility treatment costs (e.g., less frequent removal of reservoir sedimentation). The economic benefit would be slightly offset as a result of sediment and salinity increases due to activities associated with management of other resources.

Impacts from Coal Management. The exclusion of 14,100 acres from further leasing consideration would not likely have local social or economic impacts since it would not affect production levels during the life of the plan. However, because one of the areas proposed for exclusion—the Palisade municipal watershed—is adjacent to existing leases and an operating mine, potential expansion areas would be removed. This could adversely affect mine operators and lease holders when the currently leased resource is mined out (in 20 to 40 years) or if expansion is sought to produce a more economic property.

Impacts from Oil and Gas Management. Stipulations placed on oil and gas leases in the Grand Junction Resource Area would not likely have measurable social or economic impacts. Most of the moderate to high potential oil and gas lands are already leased, and new stipulations would not apply to their development. To the extent that restrictive lease terms do affect drilling operations, costs would increase, creating the potential for lower production and reduced royalty revenue to the federal government and Colorado. Any impacts would be felt more by individual lease holders than by the local oil and gas industry since the industry is more reliant on production in eastern Utah and other parts of western Colorado than upon production in the resource area.

Approval of ten pending APDs in the Little Book Cliffs area could result in annual gas sales of about \$800,000. In addition to generating \$100,000 in royalty payments, those sales would support six jobs and over \$100,000 in local income. The potential drilling of 23 more gas wells in the Little Book Cliffs WSA would result in just over twice the economic impacts created by the pending applications.

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Impacts from Forest Management. The sale of 2,800 cords of fuelwood annually would help offset residential energy costs and produce about \$14,000 in federal revenue. To the extent purchases were by commercial fuelwood cutters, local employment and income would be supported.

Impacts from Wilderness Management. Designating four wilderness areas would increase recreation use in the Grand Junction Resource Area. Improved access and greater public awareness of these areas would draw recreationists from outside the resource area. While some of the recreation use would be activity displaced from already established wilderness areas, much of it would be new activity occasioned by the unique character of these areas.

Economic benefits would be diffuse but would concentrate on those businesses providing tourist and recreation sales and services. Small but particularly noticeable benefits would accrue to the smaller communities in the southern half of the resource area. Little loss of valuable mineral resource is anticipated. (Further details on the economic effect of wilderness designation is available in Appendix I.)

Impacts from Land Tenure Adjustment. The 27,956 acres made available for disposal would add about 4 percent to the resource area's private land base. This increase has the potential to have a downward influence on the price of undeveloped land, particularly on nearby properties. Any downward influence would benefit potential buyers but adversely affect landowners.

If all the tracts were sold (and not exchanged) sales revenue could be as much as \$8.4 million based on an estimated average sale price of \$300 per acre. Receipts would go primarily to the federal treasury. Local property tax revenues would increase but payments in lieu of taxes would decline.

Cumulative Impacts on Social and Economic Conditions

The cumulative impact on the local economy is likely to be beneficial but not large. Active management of several wilderness areas could produce locally significant economic benefits. Sales of public land could generate considerable federal revenue. Some individuals, particularly mineral leaseholders and owners of land adjacent to public land offered for sale, could be affected by recommendations found in this alternative.

IMPACTS ON TRANSPORTATION

Impacts from Proposed Management Actions

Impacts from Transportation Management. Acquiring 23.75 miles of public road access (with a potential of an additional 22.25 miles), 19 miles of administrative road access, and 3.75 miles of public trail access (with potential of an additional 3.0 miles) would increase public and administrative access in the resource area. This increase of easement acquisitions would open up 37 isolated public land areas to public use.

IMPACTS ON PUBLIC UTILITIES

Impacts from Proposed Management Actions

Classifying public land as suitable (480,799 acres), sensitive (531,524 acres), and unsuitable (267,737 acres) would provide utility companies with information with which to plan and design utility projects. This would save both the utility companies and the BLM time and money by not having to redesign projects. However, compared with the Continuation of Current Management Alternative, approximately 87,318 fewer acres would be placed in the sensitive category. The acreage unsuitable for public utilities would increase by 79,618 acres. Most of the increase in unsuitable acreage would result from not allowing public utility construction in VRM Class II areas and on slopes over 40 percent (Summary Table, Chapter 2).

Restriction of projects in VRM Class II areas would have a minor impact on public utility companies except for the slopes of Grand Mesa and Douglas Pass. Restriction in these areas would be a moderate impact since both have been considered for location of major power lines projects.

Restriction of projects on slopes greater than 40 percent would have a moderate impact on public utility companies in that they would have to route projects to avoid steep slopes. Since most projects are currently located on slopes less than 40 percent, this requirement would probably not be a major impact on public utility companies.

COMPARISON OF ALTERNATIVE IMPACTS

The impacts of the four alternatives due to specific management actions were all compared to de-

Short-Term Use Versus Long-Term Productivity

termine the relative impacts of each alternative. These summaries and comparisons were derived from the detailed impact assessments in Chapter 4. The comparison ratings are based upon best professional judgment and were rated on a numerical scale, along a continuum of -3 to +3, as shown in Figure 4-3.

The results of the overall impact analysis and comparison for the four alternatives are presented on Table 4-5. The number presented in the table should not be construed as having any statistical significance.

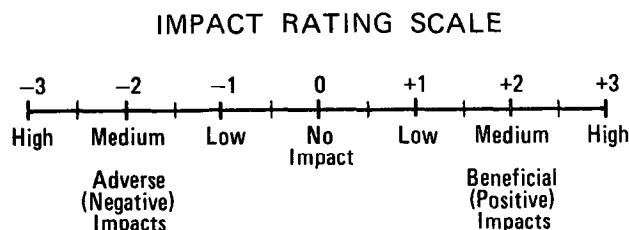


Figure 4–3

Table 4-5. Comparison of Alternative Impacts

Management Action	CCMA	CA	ProA	PA
Air Quality	0	0	0	0
Soils Management.....	+1.0	0	+2.0	+1.5
Water Resource Management	-0.5	+2.0	+1.5	+2.0
Locatable Minerals Management	-0.5	+2.5	-2.0	-1.0
Coal Management	-1.5	-0.5	-2.5	-0.5
Oil and Gas Management.....	-1.5	+2.5	-2.5	-1.0
Mineral Materials Management.....	-0.5	0	-2.5	-1.0
Paleontological Resource Management	+2.0	+2.0	+2.5	+2.5
Forest Management.....	-1.5	+2.0	-2.0	-1.0
Wildlife Management.....	-1.0	-2.0	+2.0	+1.0
Threatened and Endangered Species Management	+0.5	0	+2.0	+1.0
Livestock Grazing Management	0	0	-2.0	+1.0
Wild Horses Management	+1.0	-2.0	+3.0	-2.0
Cultural Resources Management	-0.5	-2.0	+2.5	+2.0
Recreation Resources Management.....	-1.5	-1.0	+2.5	+1.5
Visual Resources Management	-1.5	-3.0	+2.5	+1.5
Off-Road Vehicle Management	-1.5	+2.5	-2.5	-1.0
Wilderness Management	-1.0	-3.0	+3.0	+2.0
Social and Economics	0	+1.0	+0.5	+1.0

Impacts from and impacts on support management actions (fire, utilities, transportation, and land tenure), were considered in impacts on other management action.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

This section identifies the tradeoffs between short-term use and long-term productivity of the resources involved in the four alternatives. For this analysis, short term refers to the period of implementation of the plan within about 10 years, and long term refers to the period 20 years or beyond in

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which the proposal's adverse or beneficial impacts would still occur.

AIR QUALITY

Under all alternatives, short-term uses which would cause temporary impacts to air quality would not significantly affect long-term maintenance of air quality.

SOILS

In the short term, soil loss would increase slightly under all alternatives from major surface-disturbing activities. The most short-term soil loss would occur under the Commodity Alternative. The least loss would result under the Continuation of Current Management Alternative. These short-term losses would not adversely impact the long-term productivity of the soil. In the long term, increased erosion would be expected in intensive off-road vehicle (ORV) use areas. ORV use is proposed in all alternatives, but is most extensive in the Commodity Alternative. Disposal of land now under BLM administration could result in long-term conversion of land from agricultural to other uses, thus impacting the soil resource. The greatest long-term increase in soil productivity would result from management actions taken under the Preferred Alternative.

WATER QUALITY

Water quality conditions in the short term would decline under all alternatives from major surface-disturbing activities. The Commodity Alternative proposes the most surface-disturbing activities. In the long term, for all but the Continuation of Current Management Alternative, improvement in water quality would be expected because of watershed treatment projects and vegetation reestablishment. Restrictions on ORV use in the Protection and Preferred Alternatives would improve water quality. The Preferred and Commodity Alternatives identify the most projects that would improve water quality. The Continuation of Current Management Alternative would produce the least improvements in water quality.

LOCATABLE MINERALS, COAL, OIL AND GAS, AND MINERAL MATERIALS

Long-term adverse effects on mineral productivity would occur under all alternatives due to conflicts and restrictions proposed by other resource activities. The Commodity Alternative proposes the least restrictions, and the Protection and Preferred Alternatives proposed the most restrictions. Loss of mineral production could occur in the long term due to the number and amount of minerals considered unrecoverable with present mining technology and practices.

PALEONTOLOGICAL RESOURCES

In the short term, for all alternatives, paleontological resources could benefit because the increased project work would create the need for inventories on the land to be affected by the projects. Under all alternatives, the loss of paleontological resources through surface and subsurface disturbance would create a permanent loss of scientific data.

FORESTRY

In the short term, for all alternatives, forestry resources could be reduced as a result of major surface-disturbing activities. This disturbance would occur on more acreage in the Commodity Alternative. The disturbance to forestry resource would not be long term. Vegetation cover would reestablish on disturbed areas, and there would then be an increase in forest growth and reproduction, seedling establishment, and litter accumulation. Long-term adverse effects on forest productivity would occur in all alternatives due to conflicts and restrictions proposed by other resource activities. The Commodity Alternative proposes the least restrictions, and the Protection and Preferred Alternatives propose the most restrictions with their wilderness recommendations.

WILDLIFE

In the long term, native wildlife habitat would decrease in area and quality under all alternatives due to surface-disturbing and habitat displacing activities. The Commodity Alternative proposes the most unrestrained surface-disturbing activities. Local improvements in habitat condition would arrest, and in some cases reverse, the process of wildlife popula-

Short-Term Use Versus Long-Term Productivity

tion declines in the short term. There are no wildlife management proposals that, if implemented, would significantly reduce long-term, area-wide production of other resources.

THREATENED AND ENDANGERED SPECIES

Protection of threatened and endangered species and their significantly used habitat would maintain this resource into the long term. The potential to re-occupy new areas will continually decrease and re-introduction would only apply to remaining habitat. These conditions exist regardless of the alternative, yet the Protection Alternative would be the most effective in retarding the process. No proposal to benefit sensitive, threatened or endangered species would significantly interfere with the production or use of other resources.

WILD HORSES

Wild horse habitat conditions in the short term would decline under all alternatives from major surface-disturbing activities. The long-term impact from coal development would be displacement of horses from preferred habitat. The Continuation of Current Management, Commodity, and Preferred Alternatives propose the most surface-disturbing activities and coal development. The Protection Alternative identifies the most proposals to benefit wild horses.

CULTURAL RESOURCES

In the short term, for all alternatives, cultural resources could benefit because the increased project work would create the need for cultural inventories and clearances on the land to be affected by the projects. Under all alternatives, the loss of cultural resources through surface disturbance would create a permanent loss of scientific data.

RECREATION

In the short term, recreational activities on public land would remain relatively constant under all the alternatives although recreational use in designated wilderness areas may increase. In the long-term, however, recreational opportunities would be increased under all alternatives except Continuation of Current Management. Under the Protection and

Preferred Alternatives, the increase would be caused by more access, improved water quality, protection of important recreation settings and opportunities, and better wildlife habitat which would increase game populations. Under the Commodity Alternative, facility dependent recreation opportunities would improve while resource dependent opportunities would sharply decrease. Disposal of land now under BLM administration could result in long-term conversion of land from recreation to other uses, thus impacting the recreation resource.

VISUAL RESOURCES

Over the short term, for all alternatives, major surface-disturbing activities would create some visual intrusions. These adverse impacts would be greatest under the Commodity Alternative and least under the Protection Alternative. Revegetation on disturbed areas would lessen the long-term visual impacts.

WILDERNESS

In both the short and long term, any wilderness designation within existing wilderness study areas would restrict potential productivity of mineral development, timber harvesting, motorized recreational opportunities, or any other use restricted in wilderness areas. The Protection Alternative represents a long-term commitment to protection of wilderness values in all wilderness study areas (WSAs). The Preferred Alternative represents a long-term commitment to protection of wilderness values in four WSAs. The Commodity and Continuation of Current Management Alternatives represent a long-term commitment to manage all WSAs for resource values other than wilderness.

SOCIAL AND ECONOMIC

In the short term, social and economic conditions in the area would not be significantly affected by management proposals under any of the alternatives. In the long term the Commodity Alternative could produce increased economic benefits because of reduced restrictions on mineral leasing and lease development. If wilderness areas were designated as proposed under the Protection and Preferred Alternatives, local economic effects could be generated in the long term. There is some potential for land disposed of by BLM to be converted

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to higher valued or more efficient uses in the long term.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section identifies the extent to which the four alternatives would irreversibly limit potential uses of the land and resources. Irreversible and irretrievable commitments of resources occur when a wide range of future options are foreclosed.

AIR QUALITY

No irreversible or irretrievable commitments are anticipated.

SOILS

Loss of soil due to conversion of agricultural land to other uses is regarded as being irreversible. Erosion losses are considered to be irretrievable.

WATER QUALITY

Irreversible commitments would probably be limited to aquifer modification by coal mining.

LOCATABLE MINERALS, COAL, OIL AND GAS, AND MINERAL MATERIALS

Minerals mined, consumed, or left underground as unrecoverable would be irretrievably lost to future uses. The designation of existing wilderness study areas for wilderness would result in the irreversible and irretrievable loss of mineral development in those areas under normal circumstances.

PALEONTOLOGICAL RESOURCES

The paleontological resources destroyed by other resource uses and activities would be irretrievably lost.

FORESTRY

The designation of existing wilderness study areas for wilderness would result in the irreversible and irretrievable loss of harvest potential in those areas.

WILDLIFE

Wildlife habitat lost through public land disposal, energy development, urban expansion and project implementation would be irretrievably and irreversibly lost.

THREATENED AND ENDANGERED SPECIES

Almost all unoccupied or lightly used threatened and endangered species habitat lost through public land disposal, energy development, urban expansion and project implementation would be irretrievably and irreversibly lost.

WILD HORSES

Wild horse habitat could be irreversibly altered from energy development in the wild horse range. This could have the irreversible effect of creating a nonviable breeding population of wild horses.

CULTURAL RESOURCES

Destruction of cultural resources would result in an irretrievable loss of additional information to the existing scientific data base.

RECREATION

The designation of existing wilderness study areas for wilderness would result in the irreversible and irretrievable loss of motorized recreation opportunities in those areas. Shifts in Recreational Opportunity Spectrum (ROS) classes toward the urban end of the spectrum would result in irreversible and irretrievable losses of the resource-dependent recreational experience opportunities in the affected areas.

Irreversible or Irretrievable Commitments of Resources

VISUAL RESOURCES

Irreversible or irretrievable changes in landscape character are anticipated on public lands affected by public land disposal, energy development, urban expansion, utility development and other mineral activities.

WILDERNESS

The nondesignation of existing wilderness study areas would result in an irreversible and irretrievable loss of wilderness values in those areas.

LAND TENURE

Disposal of public land would result in an irreversible and irretrievable loss of administrative con-

trol and public use for all resource values except mineral value on those parcels.

SOCIAL AND ECONOMIC

No irreversible or irretrievable commitments are anticipated.

NET ENERGY ANALYSIS

A specific energy analysis was not performed for this environmental impact statement because no major actions affecting specific sites are being proposed. A meaningful net energy analysis requires that a specific action be analyzed and some preliminary engineering data be available. A site-specific energy analysis will be included in the environmental document prepared for any major site-specific actions.

CHAPTER 5

CONSULTATION AND COORDINATION

CHAPTER 5

CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION

IN PREPARATION OF THE DEIS

During preparation of this resource management plan (RMP) and draft environmental impact statement (DEIS), state and local agencies, organizations, and academic institutions were contacted to gain information and close data gaps. A partial list of these agencies, organizations, and institutions follows:

Federal Agencies

Soil Conservation Service
Fish and Wildlife Service
U.S. Forest Service
Office of Surface Mining
Minerals Management Service
Department of Energy
U.S. Geological Survey
Bureau of Reclamation
Western Area Power Administration
National Park Service
Bureau of Land Management (Moab, Montrose and Craig District Offices)
Advisory Council on Historic Preservation

Congressional

Western slope representatives for Senator Bill Armstrong, Senator Gary Hart and Congressman Ray Kogovsek.

Colorado State Agencies

Office of the Governor
Division of Wildlife
Department of Natural Resources
Mined Land Reclamation Board

Department of Forestry
Highway Department
Division of Parks
State Engineers Office
State Historic Preservation Officer
Colorado Natural Areas Program, Department of Natural Resources

Utah State Agencies

State Paleontologist

Mesa County Agencies

Planning Department
Parks and Recreation Department
Sheriff's Department
Policy and Research Office
Health Department
Road Department
Commissioners

Garfield County Agencies

Road Department
Planning Department
Sheriff's Department
Commissioners

Delta County Agencies

Planning Department
Commissioners

Local Agencies/Organizations

Fruita Mayor and City Manager
Museum of Western Colorado
Fruita Police Department
Palisade City Manager

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Grand Junction Water Department
Collbran Town Clerk
De Beque Public Works Department
Denver Museum of Natural History

Academic Institutions

Mesa College
Colorado Outward Bound
Bookcliff Junior High School, Grand Junction
Fruita High School
University of Colorado, Boulder
University of Southern California, Long Beach

Interest Groups

Friends of the Mustangs
Audubon Society of Western Colorado
Trout Unlimited
Friends of the Earth
Colorado Open Space Council
Western Colorado Congress
Partners, Inc.
Mesa Monument Striders
Two Rivers Citizens' Association
Grand Junction Outing Club
Good Sam Travel Club
Orchard Mesa Gun Club
Earth Resources Association
Colorado Archaeological Society

Advisory Committees

Grand Junction District Advisory Council
Grand Junction District Grazing Board
State Trails Advisory Committee

PUBLIC PARTICIPATION

Throughout the planning process, concerns and interests of all publics were addressed in a variety of public participation activities. The area manager and RMP team members met frequently with county commissioners, environmental groups, the

district advisory council and grazing board, and concerned citizens.

In December 1982, a Notice of Intent was submitted to the *Federal Register*. This notice began the planning process. Invitations to participate in the planning process were sent to nearly 1,000 individuals, organizations, agencies, special interest group, and the general public. The letter outlined the planning process and listed BLM staff specialists assigned to the planning team and their respective area of expertise.

Additionally, individuals were invited to attend one of a series of public scoping meetings held in February 1983 in Grand Junction and Denver. The purpose of the meetings was to explain the objectives and goals of the RMP and identify resource management issues. More than 450 issue statements were received either by mail or at scoping meetings. Land tenure adjustments, off-road vehicle use, recreation, wilderness and wildlife received the most response.

The first RMP newsletter was published in June 1983 and mailed to about 500 persons who requested information on the planning process. Subsequent newsletters were published and mailed out in November 1983 and October 1984.

Changes in the RMP planning criteria required an additional public comment period in November 1984. Proposed changes in criteria for land tenure adjustment, coal and public utilities, with short rationale for each, were published in the *Federal Register* and described in a fact sheet.

LIST OF PREPARERS

FOREST W. (FROSTY) LITTRELL, Area Manager

B.S. Range Management, New Mexico State University

Experience: 1-1/2 years area manager, BLM, Grand Junction, Colorado; 1 year area manager, BLM, Farmington, New Mexico; 9 years area manager, Buffalo, Wyoming; 4 years area manager, Winnemucca, Nevada; 4 years range conservationist, BLM, Las Cruces, New Mexico.

JAMES M. KEETON, Team Leader

B.S. Geography, Southern Illinois University; M.S. Outdoor Recreation Management, Southern Illinois University

List of Preparers

Experience: 2-1/2 years RMP/EIS team leader, BLM, Grand Junction, Colorado; 5 years outdoor recreation planner, BLM, Grand Junction, Colorado; 3-1/2 years outdoor recreation planner, BLM, Meeker, Colorado; 1/2 year assistant park manager, Pierre Marquette State Park, Illinois.

SCOTT F. ARCHER, Air Quality/Climate

B.S. Environmental Science and Chemistry, Northern Arizona University

Experience: 3-1/2 years air quality specialist, BLM, Denver, Colorado; 4-1/2 years consultant, Environmental Protection Agency, Las Vegas, Nevada.

ROGER BAKER, Oil and Gas, Public Utilities

B.S. Range-Forest Management, Colorado State University

Experience: 5 years surface reclamation specialist, BLM, Grand Junction and Meeker, Colorado; 2 years range conservationist, BLM, Las Vegas, Nevada.

TOM BARGSTEN, Soils

A.S. Agronomy, Mesa College, Grand Junction, Colorado; B.S. Soil Science, Colorado State University; M.S. graduate work, Colorado State University

Experience: 8 years soil scientist, BLM, Grand Junction, Colorado; 11 years soil scientist, Soil Conservation Service, State of Colorado; 4 years research technician, Agricultural Research Service, Fort Collins, Colorado.

THELMA BARNES, Cartographic Technician

A.A. Music, Bakersfield Junior College; B.A. Human Services, Mesa College, Grand Junction, Colorado

Experience: 8 years cartographic technician, BLM, Grand Junction, Colorado; 1 year clerk, Mesa County Assessor's Office, Grand Junction, Colorado; 18 years teacher, Bakersfield City School District, California.

LINDA CERISE, Editorial Clerk

Secretarial Certificate, Parks College, Denver, Colorado

Experience: 1 year editorial clerk, BLM, Grand Junction, Colorado; 1-1/2 years purchasing agent/contract specialist, BLM, Grand Junction, Colorado; 4 years resource clerk/district clerk, U.S. Forest Service, Glenwood Springs, Aspen, and Fort Collins, Colorado; 1 year secretary, Department of Health Education and Welfare, Fort Collins, Colorado.

BETSY DANIEL, Colorado State Office Coordinator

B.A. Geology, Vanderbilt; M.A. Geo-Chemistry, Johns-Hopkins University

Experience: 4-1/2 years planning and environmental coordinator, BLM, Denver, Colorado; 1 year geologist, BLM, Santa Fe, New Mexico; 3-1/2 years geologist, BLM, Montrose, Colorado.

SUSAN DERR, Cartographic Technician

Assoc. Degree Industrial Drafting, Community College, Denver, Colorado

Experience: 8 years cartographic technician, BLM, Denver, Colorado; 2-1/2 years as cartographic technician, U.S. Geological Survey, Denver, Colorado.

JOANN GRAHAM, Editor

Experience: 3 years technical publications editor, BLM, Glenwood Springs and Grand Junction, Colorado; 4 years technical publications editor, BLM, Oregon and Wyoming; 3 years administrative assistant, U.S. Forest Service, Denver, Colorado; 10 years secretary/editorial clerk, U.S. Air Force, Colorado Springs, Colorado.

LARRY HAND, Access-Transportation

B.S. Park and Recreation Management, University of Oregon.

Experience: 1 year easement acquisition specialist, BLM, Grand Junction, Colorado; 5 years supervisory realty specialist, BLM, Grand Junction, Colorado; 2 years realty specialist, BLM, Fairbanks, Alaska; 2-1/2 years outdoor recreational planner, BLM, Winnemucca, Nevada; 2 years recreation technician, BLM, Medford, Oregon; 1 year forestry technician, U.S. Forest Service, McKenzie Bridge, Oregon.

Chap. 5, Consultation and Coordination

C. MICHAEL HICKS, Forestry

B.S. Forestry and Wildlife, Virginia Polytechnic Institute and State University

Experience: 5 years area forester, Grand Junction, Colorado; 3 years forester, BLM, Salem, Oregon.

MARY K. HIGH, Cultural Resources

B.A. Anthropology, University of New Mexico

Experience: 1-1/2 years area archaeologist, Grand Junction, Colorado.

DOUGLAS HUNTINGTON, Planning Coordinator

B.A. Physical Geography, Pittsburg State University;
M.A. Environmental Planning, Kansas State University

Experience: 4 years planning and environmental coordinator, BLM, Grand Junction, Colorado; 3 years reclamation/assessment specialist, Office of Surface Mining, Kansas City, Missouri; 1 year forestry technician, U.S. Forest Service, Boise, Idaho.

ANN IZARD, Clerk-Typist

Clerk-Typist Certificate, Western Wisconsin Technical Institute, LaCrosse, Wisconsin

Experience: 4 months Clerk-Typist, BLM, Grand Junction, Colorado; 6 years Personnel/Staffing Clerk, Civilian Personnel Office, Fort McCoy, Wisconsin; 5 years Product Information Specialist, Ray-O-Vac Division, Madison, Wisconsin.

ROY JOHNSON, Fire Management

B.S. Natural Resource Management, Boise State University; M.S. graduate work, Colorado State University

Experience: 8 years fire management officer, BLM, Grand Junction, Colorado; 1 year training specialist, Boise Interagency Fire Center, Boise, Idaho; 3 years fire management specialist, Boise Interagency Fire Center, Boise, Idaho; 2 years smokejumper, U.S. Forest Service, McCall, Idaho; 3 years Inter-regional Fire Crew, McCall, Idaho.

WADE JOHNSON, Wilderness

B.A. Conservation Education, University of Colorado; M.S. Recreation Resources, Colorado State University

Experience: 11 years recreation planner, BLM, Craig and Grand Junction, Colorado; 2 years regional planner, Navajo Development Council, Blanding, Utah.

MICHAEL KLISH, Oil and Gas

B.S. Forest and Range Management, Colorado State University; M.S. Plant Ecology, Colorado State University.

Experience: 7 years surface reclamation specialist, BLM, Grand Junction and Durango, Colorado.

RON LAMBETH, Vegetation, Wildlife, Threatened & Endangered Species

B.A. Biology, Southern College, Collegedale, Tennessee; M.S. Range Science, University of Idaho

Experience: 6-1/2 years wildlife management biologist, BLM, Grand Junction, Colorado; 1 year technical coordinator, BLM, Grand Junction, Colorado; 1 year range conservationist, BLM, Grand Junction, Colorado; 2 years Peace Corps, Ethiopia.

CATHY LOGAN-PEARCE, Land Tenure Adjustment

B.S. Geography, Florida State University

Experience: 5 years realty specialist, BLM, Grand Junction, Colorado; 2-1/2 years cartographer, National Park Service, Omaha, Nebraska; 1/2 year cartographer, Florida Resource Environmental Analysis Center.

CINDY MC KEE, Public Participation

Experience: 6 years public affairs specialist, BLM, Cheyenne, Wyoming and Grand Junction, Colorado.

ELIZABETH S. MC REYNOLDS, Geology

B.S. Geology, Mesa College, Grand Junction, Colorado

Distribution List

Experience: 2 years resource area geologist, BLM, Grand Junction, Colorado; 5 years as District Geologist, BLM, Grand Junction, Colorado.

STEVE MOORE, Social and Economics

B.S. History, University of Santa Clara, California; M.S. Agricultural Economics, Colorado State University

Experience: 5 years economist, BLM, Grand Junction, Colorado; 1 year economist, U.S. Senate; 4 years economist, Agriculture Stabilization and Conservation Service, U.S. Department of Agriculture, Washington, D.C.

CARLOS SAUVAGE, Recreation, Off-Road Vehicles, Visual Resource Management

B.S. Outdoor Recreation Planning, Colorado State University

Experience: 7 years outdoor recreation planner, BLM, Grand Junction, Colorado; 2 years outdoor recreation planner, BLM, Cedar City, Utah; 2 years outdoor recreation planner, BLM, Rawlins, Wyoming.

JIM SCHEIDT, Water Resources

B.S. (1974) Agriculture, University of Wisconsin

Experience: 6-1/2 years hydrologist, BLM, Portland, Oregon and Grand Junction, Colorado; 1-1/2 years hydrologist, U.S. Geologic Survey, Washington; 2 years soil scientist, BLM, Oregon.

JAMES E. B. (JEB) STUART, Access-Transportation

B.S. Wildlife Biology, Utah State University

Experience: 3 years realty specialist, BLM, Grand Junction, Colorado; 2-1/2 years realty specialist, U.S. Fish & Wildlife Service, New Mexico; 3 years land specialist, New Mexico Department of Game and Fish; 3 years research technician, Utah State University.

GERALD THYGERSON, Range

B.A. Range Science, New Mexico State University

Experience: 8 years supervisory range conservationist, BLM, Grand Junction, Colorado; 5 years natural resource specialist, BLM, Grand Junction, Colorado; 4 years range conservationist, BLM, Las Cruces, New Mexico.

HOWARD TRUSSELL, Hydrology

B.S. Resource Conservation, University of Montana

Experience: 4 years hydrologist, BLM, Grand Junction, Colorado.

DISTRIBUTION LIST

Comments on the draft resource management plan and environmental impact statement are requested from the following agencies, cities, towns, and interest groups:

Federal Agencies

Department of the Interior
Bureau of Reclamation
Fish and Wildlife Service
National Park Service
Office of Surface Mining
U.S. Geologic Survey
Craig District, Bureau of Land Management
Montrose District, Bureau of Land Management
Moab District, Bureau of Land Management
Oil Shale Projects Office

Department of Energy

Environmental Protection Agency

Department of Agriculture
Agriculture Stabilization and Conservation Service
Forest Service
Soil Conservation Service

Western Area Power Administration

Colorado State Agencies

Colorado Division of Planning-State Clearing House
University of Colorado
Colorado State University

Local Government

Associated Governments of Northwestern Colorado
Delta, Garfield, Grand (Utah), Mesa, and Montrose County Commissioners and Planning Departments
Cities and Towns of Collbran, De Beque, Fruita, Grand Junction and Palisade

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Other Organizations

Advisory Council on Historic Preservation

American Petroleum Institute

Audubon Society of Western Colorado

Club 20

Colorado Association of Soil Conservation Districts

Colorado Association of 4-Wheel Drive Clubs

Colorado Cattlemen's Association

Colorado Guide and Outfitters Association

Colorado Mining Association

Colorado Open Space Council

Colorado Outward Bound

Colorado Wool Growers Association

Federal Land Bank Association

Friends of the Earth

Friends of the Mustang

Holy Cross Cattlemen's Association

Independent Petroleum Association of Mountain States

League of Women Voters

Mesa County Cattlemen's Association

Mesa County Wool Growers Association

National Audubon Society

Production Credit Association of Northwest Colorado

Rocky Mountain Oil and Gas Association

Sierra Club

The Wilderness Society

Trout Unlimited

Western Colorado Congress

APPENDIXES

APPENDIX A

ALTERNATIVE FORMULATION

The Continuation of Current Management Alternative was developed using available inventories and planning documents to determine what land use allocations had previously been made. This information was then analyzed in conjunction with existing management policies and resource programs and became the Continuation of Current Management Alternative.

The Commodity and Protection Alternatives were developed by first determining each resource's priorities for management. This resulted in resource capability levels (RCLs) for each resource. The

RCLs were then mapped on overlays and general management guidelines were described.

Using the information thus gained, the resources were then ranked according to their contribution or ability to meet the goal or objectives of each alternative. The resource that received top ranking took precedence over all other resources in its management or development; the second ranked resource took next precedence, and so on for each resource. Tables A-1 and A-2 show the resource rankings for both the Commodity and Protection Alternatives.

Table A-1. Resource Ranking for the Commodity Alternative

Resource Ranking	RCL	Remarks
1. Oil and Gas	RCL 1	Known geologic structures and highly prospectively valuable areas
2. Oil and Gas	RCL 2	Prospectively valuable areas
3. Coal	RCL 1	Potential development area
4. Locatable Minerals	RCL 1	Known and suspected production areas
5. Public Utilities	RCL 3	Suitable zones
6. Mineral Materials	RCL 1	Existing use areas
7. Land Tenure	RCL 2	Disposal tracts
8. Forestry	RCL 1	Productive pinyon-juniper woodland
9. Wildlife	RCL 1	Critical habitat
10. Off-Road Vehicles	RCL 1	Open
11. Wildlife	RCL 2	Important habitat
12. Off-Road Vehicles	RCL 2	Open
13. Locatable Minerals	RCL 2	Remainder of area
14. Forestry	RCL 2	Commercial forest land
15. Mineral Materials	RCL 2	Alluvium deposits
16. Water	RCL 1	Sediment/salinity areas
17. Recreation	RCL 1	Intensive use
18. Water	RCL 2	Nonsediment/salinity areas
19. Recreation	RCL 2	Extensive use
20. Wild Horses	RCL 2	Possible expansion area
21. Recreation	RCL 2	Protection
22. Off-Road Vehicles	RCL 2	Limited
23. Wild Horses	RCL 1	Designated range
24. Threatened and Endangered Species	RCL 2	Known sensitive species habitat.
25. Off-Road Vehicles	RCL 1	Closed/Limited
26. Public Utilities	RCL 2	Sensitive zones
27. Visual Resources	RCL 1	Class II
28. Recreation	RCL 1	Protection
29. Paleontology	RCL 1	Class I
30. Cultural	RCL 2	Moderate priority sites
31. Cultural	RCL 1	High priority sites
32. Visual Resources	RCL 1	Class I
33. Wilderness	RCL 2	Possible expansion area
34. Wilderness	RCL 1	Designated wilderness study areas

Appendix A

Table A-2. Resource Ranking for the Protection Alternative

Resource Ranking	RCL	Remarks
1. Wilderness	RCL 1	Designated wilderness study areas
2. Wilderness	RCL 2	Possible expansion areas
3. Off-Road Vehicles	RCL 1	Closed/Limited
4. Visual Resources	RCL 1	Class I
5. Threatened and Endangered Species	RCL 2	Known sensitive species habitat
6. Wild Horses	RCL 1	Designated range
7. Wildlife	RCL 1	Protection
8. Visual Resources	RCL 1	Class II
9. Water	RCL 1	Sediment salinity areas
10. Cultural	RCL 1	High priority sites
11. Cultural	RCL 2	Moderate priority sites
12. Recreation	RCL 1	Protection
13. Wild Horses	RCL 2	Possible expansion area
14. Wildlife	RCL 2	Protection
15. Off-Road Vehicles	RCL 2	Limitations
16. Recreation	RCL 2	Protection
17. Paleontology	RCL 1	Class I
18. Water	RCL 2	Nonsediment salinity areas
19. Forestry	RCL 1	Productive pinyon-juniper woodlands
20. Forestry	RCL 2	Commercial forest land
21. Recreation	RCL 1	Use
22. Wildlife	RCL 1	Manipulation
23. Recreation	RCL 2	Use
24. Wildlife	RCL 2	Manipulation
25. Utilities	RCL 2	Sensitive zones
26. Utilities	RCL 3	Suitable zones
27. Mineral Materials	RCL 2	Alluvium deposits
28. Mineral Materials	RCL 1	Existing use areas
29. Coal	RCL 1	Potential development area
30. Oil and Gas	RCL 2	Prospectively valuable area
31. Oil and Gas	RCL 1	Known geologic structures and highly prospectively valuable areas
32. Off-Road Vehicles	RCL 2	Open
33. Off-Road Vehicles	RCL 1	Open
34. Locatable Minerals	RCL 2	Remainder of resource area
35. Locatable Minerals	RCL 1	Known and suspected production areas
36. Land Tenure	RCL 2	Disposal tracts

A map showing the resources emphasized under each alternative was prepared by overlaying the RCL maps for each resource. Where conflicts in use appeared, the resource with the highest priority under that alternative was given priority. Certain resources, i.e. oil and gas and wilderness, received overriding priority in conflict resolution in situations where, by law or regulation, management of other resources could not interfere with development or existing rights.

The potential for multiple use was also considered in resolving conflicts. For example, timber management and harvest in an area could, under certain circumstances, be compatible with use of the same area as critical deer winter range if specified management practices were followed. Because

of this compatibility, management described for a particular resource may change from one alternative to the other.

The Preferred Alternative was developed based on (1) issues raised throughout the planning process, (2) public input received at meetings, workshops, and in response to newsletters, and (3) the environmental analysis developed on the previously formulated alternatives. It reflects laws protecting certain environmental values, regulations of specific uses, and a wide variety of public demands.

The Preferred Alternative was selected by a team composed of the district manager, assistant district manager, area manager, team leader, and appropriate team specialists. It was reviewed by the Colorado State Director.

APPENDIX B

POSSIBLE MANAGEMENT PRACTICES

Following are lists of possible practices that could be used in the management of the various resources. These lists should not be considered comprehensive lists of all management practices.

Wildlife upland habitat management

Wildlife watering facilities

Woodland improved harvesting

WATER RESOURCES

Alternative water source development
Brush control
Buffer strips adjacent to perennial streams
Check dams
Contour furrows and trenches
Detention dams
Development with mitigation measures
Dikes
Fencing
Firebreaks
Flood water control structures
Flood plain development restrictions
Grazing land mechanical treatments
Gully plugs
Livestock exclusion
No development
Planned grazing systems
Pond sealing or lining
Range seeding
Rehabilitation of disturbed areas
Rehabilitation or improvement of wetland areas
Retention structures
Riparian area development restrictions
Siting considerations
Spring development
Stream channel stabilization
Streambank protection
Tree planting
Trough or tank installation
Waterspreading

FOREST MANAGEMENT PRACTICES

Commercial Forest Land Species 105 Spruce-Fir

Clearcutting

Shelterwood/group selection cutting

Douglas-Fir

Clearcutting

Shelterwood/selection cutting

Aspen

Clearcutting

Ponderosa Pine

Shelterwood/selection cutting

Woodland Species

Pinyon-Juniper

Selection cutting

Seed tree cutting

Clearcutting

Appendix B

WILDLIFE HABITAT IMPROVEMENT PRACTICES

Terrestrial Wildlife

Vegetation Manipulation from Typically Least to Most Disturbing

Note: Information in parentheses indicates the vegetation type most commonly associated with the form of manipulation.

Seeding (follows other treatment with frequent exceptions; e.g., burning, brush beating, or injected without major vegetation reduction)

Hand-thinning (woodland, forest)

Prescribed livestock grazing (grassland)

Brush beating (sagebrush, snowberry)

Herbicide spraying (all types, is least favored treatment)

Controlled burning (mountain shrub, sagebrush)

Hula dozing (pinyon-juniper)

Chaining (pinyon-juniper)

Disc-plowing (sagebrush, greasewood)

Water Development (usually associated with pipes and tanks to divert and retain the water)

Springbox

Water well

Guzzler (small water catchment)

Retention dam

Livestock water site modification

Cover Augmentation

Brush piles

Special food/cover plantings

Nest boxes/platforms

Snag creation

Structural Design Safety

Fence height, strand separation, visibility, and pass structures

Power line location, wire separation and visibility

Road location, shoulder vegetation, pass structures, and closures

Aquatic Wildlife

Minimum stream flows (habitat volume and temperature maintenance)

Current deflectors (bank stability, spawning area creation)

Check dams (pools for resting, sediment control)

Streambank vegetation protection (shade, bank stability)

Fish screens (protection from irrigation ditch entrapment)

Rough fish removal (prior to fish stocking)

Fish shelters (visual and water velocity cover, shade)

APPENDIX C

STANDARD DESIGN PRACTICES

INTRODUCTION

The following list of standard design practices (SDPs) includes project design features, reclamation measures, and procedures that could be applied as stipulations or requirements on proposed projects at the discretion of the authorized officer. SDPs are divided into two major sections: (1) SDPs applicable under all alternatives and (2) SDPs applicable under specific alternatives. SDPs Applicable Under All Alternatives would be necessary to satisfy requirements of law for potential of resource values. SDPs Applicable Under Specific Alternatives would be used to achieve the various management goals of the alternatives. The terms on oil and gas leases allow the use of additional mitigation measures (SDPs) to avoid or reduce undesirable impacts. The appropriate SDPs for a particular project would be selected from both sections of the list. The SDPs selected from the first section (Applicable Under All Alternatives) would be applied under all alternatives. The SDPs selected from the second section (Applicable Under Specific Alternatives) would be applied under the indicated alternative. As it was not possible to anticipate every kind of project that might be proposed, other practices not listed below might also be applied to particular projects.

STANDARD DESIGN PRACTICES APPLICABLE UNDER ALL ALTERNATIVES

General

The following practices might be applied to proposed projects as appropriate.

1. The Grand Junction Resource Area Manager will be notified at least 24 hours prior to commencing reclamation work, construction, or maintenance activities. This allows BLM personnel an opportunity to review the project with the operator/grantee to ensure a common understanding of the requirements.
2. All construction activities shall be confined to the minimum area necessary. The exterior bound-

aries of the construction area shall be clearly flagged prior to any surface-disturbing activities. This helps to reduce unnecessary and unauthorized surface disturbance.

3. Prior to cutting any fence along a right-of-way, the grantee shall firmly brace and tie the fence to prevent slacking of the wire. All braces shall be permanent H-frame construction. Upon completion of construction, the grantee shall rebuild and maintain the fence in accordance with BLM standards. This prevents damage to BLM fences and maintains their quality and usefulness.
4. An H-20 cattleguard, base, and adjacent gate will be installed. The guard will be constructed to the specifications of BLM drawing number 02457-4, and the base will be constructed to the specifications of BLM drawing number 02457-1, 2, or 3. This will help to ensure safety and usefulness of BLM roads.
5. The constructor shall clear all vegetation from the project area, where clearing is necessary, prior to any construction. All clearing work shall be completed without mixing soil with the vegetation. This helps ensure proper handling of topsoil for stockpiling and helps future rehabilitation.

All trees requiring removal shall be disposed of by the grantee. Where earth blading is required, stumps shall be removed and scattered or buried in an area designated by the authorized officer. Where earth blading is not required, stump height shall not exceed 12 inches. All slash less than 4 inches in diameter will be chipped, scattered outside the cleared area, or stockpiled for use during reclamation as directed by the authorized officer. All material 4 inches in diameter and greater will be removed from federal land unless otherwise directed. A wood permit from BLM for the wood removed will be required prior to any clearing. This prevents waste of woodland resources reduces disease and insect infestation and helps ensure appropriate treatment of cleared vegetation.

6. All above-ground facilities shall be painted to blend with the surrounding area. This reduces the visual impact of above-ground facilities.
7. Backslopes shall be constructed no steeper than (as specified, ranging from 1-1/2:1 to 3:1, run:rise). Round the upper edges of all cut-

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banks. This reduces visual impact and soil loss to erosion.

8. Trash will be confined in a covered container while the project is in progress. Upon completion, all trash, flagging, laths, etc., will be removed and hauled to an authorized disposal site. No oil or lubricants shall be drained onto the ground surface. This prevents scattering of trash, ensures removal, and prevents general pollution.
9. Drainages shall not be blocked or filled with loose dirt or debris. All drainage crossings shall be properly excavated and/or have a culvert of sufficient size installed to adequately carry the peak flow of the drainage. This prevents unnecessary soil loss and erosion.
10. All soil erosion associated with the operation must be stabilized to a condition at least equal to that present before disturbance. This reduces soil loss.
11. For projects requiring long term surface occupancy (producing wells, facility sites, permanent roads, etc.), access roads will be upgraded and maintained as necessary to prevent soil erosion and accommodate year round traffic; all disturbed areas unnecessary to operations will be stabilized, and all disturbed areas outside the work area will be seeded according to the BLM approved seed mixture. For projects requiring short-term surface occupancy, or abandoned projects (dry wells, pipelines) all disturbed areas will be stabilized and seeded according to the BLM approved seed mixture; all compacted areas will be ripped or disked prior to seeding. These measures minimize soil loss and increase reclamation potential.
12. All disturbed areas will be seeded with the seed formula approved by the Grand Junction Resource Area Manager. A seedbed will be prepared by contour cultivating 4 to 6 inches deep where possible. Drill seed 1/4 to 1/2 inch deep. In areas that cannot be drill seeded, broadcast seed using twice the recommended drilling rate and cover with a harrow, drag bar, or chain. Seeding must be completed after August 15 and prior to October 15 above 6,500 feet elevation and after September and prior to October 15 below 6,500 feet elevation. Seeding of disturbed areas is required wherever the level of disturbance has resulted in significant vegetation losses. This measure helps to minimize the impacts of surface-disturbing activities by using seed formulas, cultivation practices, and seeding techniques that are the most likely to result in successful revegetation in the shortest possible time.
13. Existing roads will be used wherever possible. Additional roads shall be kept to the minimum. Route locations must be approved by BLM prior to construction.
14. Road construction shall be to BLM road standards (BLM Manual Section 9113). This prevents unnecessary roads and controls road design thus reducing related soil and vegetation disturbance. Road safety and reliability are also improved.
15. The following measures help to ensure safe culvert installations and minimize soil loss.
 - a. For small culverts (less than 36 inches in diameter): All fill material will be placed in layers not exceeding 6 inches. Fill material will be compacted with a hand compactor 12 inches on both sides and above the culvert. Fill outside of the 12-inch limit shall be placed in 6-inch lifts or less and compacted with a rubber-tired vehicle or using other standard compaction methods.
 - b. Prior to installation of large culverts (more than 36 inches in diameter) existing material will be removed to a depth two feet below the natural streambed. This material shall be replaced with a well graded 3/4 inch minus material. On each side of the CMP there will be an area of 3/4 inch minus material at least three feet wide or the width of the streambed, whichever is greater. The total depth of the 3/4 inch minus material. All fill will meet the following compaction standards:
 1. A gradation curve and proctor analysis for the 3/4 inch minus fill and a proctor analysis on the native fill will be supplied to the BLM prior to any construction on the drainage crossing.
 2. All fill material will be placed in layers not exceeding six inches.
 3. Compaction will be 95 percent of maximum density as identified by the proctor analysis.
 4. The compaction will be tested after the placement of each six-inch layer as per A.A.S.H.T.O. T.99 method C or D.
 5. A BLM engineering representative will conduct the compaction testing if time is available or the operator may acquire the appropriate tests from a BLM approved engineering firm.
16. When blasting is necessary, the following precautions will be used to help to prevent under-

The culvert invert(s) shall be installed at the elevation of the natural streambed. The up and down stream fill slopes will be riprapped with a well graded mixture of rock sizes containing no material greater than 2 feet or smaller than 3 inches. The ratio of maximum to minimum dimension of any rock shall not exceed 6:1.

Standard Design Practices

sirable impacts to cultural and recreation resource and help to reduce safety hazards associated with blasting:

- a. In areas of human use, blasting blankets will be used.
 - b. Landowners or tenants in close proximity to the blasting will be notified in advance of the blasting so that livestock and other property can be adequately protected.
 - c. Access to the blasting area will be restricted by construction personnel stationed at each end of the area to be blasted.
 - d. Blasting within 1/8 mile of federally-owned or controlled springs and flowing water wells must be approved in writing by the area manager.
 - e. No blasting will be permitted within 1/4 mile of historic trails, natural areas, identified archaeological sites, and recreation areas.
 - f. Powder magazines will be located out of sight or at least 1/2 mile from roads. Loaded shot holes will not be left unattended. Approval from the area manager will be obtained for the magazine locations.
17. At a minimum, an average of three to seven of the largest standing, nonhazardous, dead trees per acre will be retained for cavity nesting birds.

Wildlife and Forestry Standard Design Practices

All timber and fuelwood sales will be laid out in consultation with the wildlife biologist and other resource specialists as appropriate. Sales will be designed to benefit wildlife using the following prescriptions, with the strictest adherence within one-quarter mile of perennial streams.

1. Timber and fuelwood sales will not be permitted in riparian areas.
2. Seasonal restrictions will be observed on critical wildlife areas as are other potentially disturbing activities requiring BLM permits (recently cut green juniper needles are highly preferred by deer so winter range restrictions will not normally apply in deer winter range).
3. The closure of new roads will be considered for and planned for during sale preparation in accordance with existing policy.
4. Small clear cuts will be considered for use in the pinyon-juniper and aspen types in critical big game winter ranges and other areas where economically feasible.

5. Sales will maximize the length of edge per amount of area considering natural and man made boundaries.
6. No point within an opened stand will be more than 200 yards from cover (an open stand is one that will not hide a walking person 50 yards from an observer; adequate cover is the inverse of this).
7. The removal of cover along edges of existing openings (foraging areas) in the pinyon-juniper and aspen types will be discouraged.
8. Select cuts that thin the pinyon-juniper canopy cover to 20 percent or less will be favored for use in bighorn sheep ranges.
9. Large coniferous seed trees will be left where practical as wildlife shelter on south facing slopes of big game winter ranges at a minimum density of 3 to 7 trees per acre and elsewhere to maintain the succession of quality snags.
10. All sales will be kept a minimum of 100 feet from perennial streams, except for crossings associated with road construction.
11. An average of 3 to 7 per acre of the largest nonhazardous snags, particularly those adjacent to openings and aquatic sites (open water), will be left per acre on commercial sales.
12. All disturbed areas (roads and trails and landings) will be reseeded. Sites with less than a 15 percent ground cover in the understory on critical deer and elk winter ranges will also be seeded with wildlife funds with a mixture of grasses, forbs and shrubs.
13. Slash will not be burned in the pinyon-juniper and aspen types.
14. Pinyon-juniper will be managed on a minimum of a 180 year rotation. Other species will be managed on a rotation of sufficient lengths to produce cavity trees for flickers and small owls.
15. Clear cuts will be discouraged in small isolated tall conifer stands under 160 acres in size.
16. Cavity rich portion of aspen stands will be reserved from cutting.

Pipeline Standard Design Practices

The following practices might be applied primarily to pipeline projects as appropriate:

1. A preconstruction field conference shall be requested by the grantee at least five working

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days prior to any construction activities unless otherwise agreed upon by the authorized officer. This helps to ensure understanding and acceptable performance of the grant terms by the operator/grantee.

2. Once the pipeline is constructed, the grantee/operator shall restore the existing roadway to meet or exceed conditions prior to construction. The preconstruction width of the driving surface shall also be restored and erosion control structure installed subject to approval of the authorized officer. The grantee/operator shall be responsible for road maintenance from the beginning to completion of operations. This may include, but not be limited to, blading the roadway, cleaning ditches and drainage facilities, dust abatement, or other requirements as directed by the authorized officer. These measures ensure proper restoration and maintenance of roads used during pipeline construction.
3. Construction width shall include the existing road. The pipeline shall be located 2 to 3 feet from the edge of the ditch along the existing road. The existing road shall be on the working side of the trench. These measures minimize the amount of new disturbance necessary to install a pipeline.
4. The pipeline will be buried to provide a minimum cover of 36 inches through normal terrain. The pipeline will be buried deep enough to avoid problems with irrigation ditches, canals, potential irrigation areas and existing pipelines, as designated by the authorized officer. In rocky areas, a minimum cover of 24 inches will be provided. In areas adjacent to or crossing access roads, the pipeline shall be buried with a minimum of 4 feet of cover in alluvial areas and 3 feet of cover in rocky areas. This reduces safety hazards.
5. The grantee shall accomplish the crossing of the pipeline owned by (company name) in accordance with an agreement between that company and the grantee/operator. This reduces safety hazards and protects the rights of the company that owns an existing pipeline.
6. The grantee shall construct water bars or kicker dikes, on all of the rights-of-way, as directed by the authorized officer. The water bars or dikes shall be constructed across the full width of the disturbed area. This helps to reduce soil erosion.
7. Pipeline location warning signs shall be installed within five days of construction completion. Each sign shall be permanently marked with

the right-of-way serial number. This is to prevent accidents during subsequent construction.

Oil and Gas Drilling Standard Design Practices

The following practices might be applied primarily to oil and gas drilling projects as appropriate:

1. There shall be no deviation from the proposed drilling and/or workover program as approved. All wells, whether drilling, producing, suspended, or abandoned, shall be identified in accordance with 30 CFR 221.22. Pressure tests are required before drilling out from under all casing strings set and cemented in place. Blowout preventer controls must be installed prior to drilling out the surface shoe and prior to starting workover or completion operations. Preventers will be inspected and operated at least daily to insure good mechanical working order. This inspection will be recorded on the daily drilling report. Preventers will be pressure tested before drilling out from below each casing string. All BOP pressure tests must be recorded on the daily drilling report. This helps to ensure compliance with approved programs and safe drilling practices.
2. If air drilling, the operator shall control blooie line discharge dust by use of water injection or any other acceptable method. The blooie line discharge shall be a minimum of 125 feet from the well head and be directed into the blooie pit in such a manner as to allow containment of drill bit cuttings and waste in blooie pit. The blooie pit should be in at least 50 percent cut. This prevents unnecessary dust discharge and maintains the end of the blooie line a safe distance from the well.
3. If a tank battery is constructed on this lease, it must be surrounded by a fire wall of sufficient capacity to adequately contain the storage capacity of the battery. This provides enough capacity to prevent the leakage of liquids over a large area.
4. Plugging Standards: The following measures help to ensure safe plugging and protect water and mineral resources.
 - a. Open Hole. A cement plug shall be placed to extend at least from 50 feet below the bottom (except as limited by total depth (TD) or plugged back total depth (PBSD)) to 50 feet above the top of (1) any zones encountered during drilling which contain fluid with a potential to migrate; (2) lost circulation zones; and (3) any potentially valuable min-

Standard Design Practices

erals, including noncommercial hydrocarbons, coal, and oil shale.

Extremely thick sections may be secured by placing 100-foot plugs across the top and bottom of the formation. Lost circulation zones may require alternate methods. In absence of productive zones or minerals which otherwise require placement of cement plugs, long section of open hole should be placed across in-gauge sections of the hole.

b. Cased Hole. A cement plug shall be placed opposite all open, perforations and extend a minimum of 50 feet below (except as limited by TD or PBD) to 50 feet above the perforated interval. In lieu of the cement plug, a bridge plug is acceptable, provided (1) the plug is set as close as practical above the open perforations; (2) the perforations are isolated from any open hole below; and (3) the plug is capped--if cap is placed through tubing, a minimum of 25 sacks of cement but not less than 50 feet of fill-up is required; if placed by bailer, a minimum of 35 feet of fill-up is needed (no volume minimum).

If production casing is cut and recovered, a cement plug shall be placed to extend at least 50 feet above and below the stub. An additional cement plug shall be placed to extend a minimum of 50 feet above and below the shoe of the surface casing (or intermediate string, as appropriate). The exposed hole resulting from the casing removal must be secured as required above.

c. Annular Space. No annular space that extends to the surface shall be left open to the drilled hole below. If this condition exists, a minimum of the top 100 feet of annulus shall be plugged with cement.

d. Testing. The first plug below the surface plug shall generally be tested by either tagging the plug with the working pipe string or pressuring to a minimum pump (surface) pressure of 1000 psig with no more than a 10 percent drop during a 15-minute period (cased hole only). If the integrity of any other plug is questioned, it must be tested in the same manner. Also, any cement plug that is the only isolating medium for a fresh water interval or a zone containing a valuable mineral deposit should be tested by tagging with the drill string.

Tagging the first plug below the surface plug will not be necessary where water flows or valuable mineral deposits have not been encountered.

e. Surface Plug. A cement plug of at least 50 feet (but not less than 25 sacks of cement) shall be placed in the smallest casing that extends to the surface. The top of this plug shall be placed as near the eventual casing cut-off point as possible.

f. Mud. Each of the intervals between the plugs shall be filled with mud of sufficient density to exert hydrostatic pressure exceeding the greatest forma-

tion pressure encountered while drilling such interval. In the absence of other information at the time plugging is approved, a minimum mud weight of 9 pounds per gallon shall be specified.

g. Surface Cap. All casing shall be cut off at the base of the cellar or 3 feet below final restored ground level (whichever is deeper; the casing shall be filled from the cement plug to the surface with suitable material (cement, sand, gravel, etc.). The well bore must then be covered with a metal plate at least 1/4 inch thick, welded in place, or a cement cap extending at least 12 inches beyond the largest diameter pipe and at least 4 inches thick.

5. All oil will be immediately removed from the surface of reserve pits. This will allow more rapid evaporation and reduce the hazard to birds which may land on the fluids of the pits.
6. The reserve pit will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. Fencing will be four strands of barbed wire or 48-inch woven wire. All corners will be braced with a wooden H-type brace. The fence construction will be on cut or undisturbed surface. The reserve pit will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. The fence shall be of gameproof construction and 48 inches high. The bottom 48 inches will be woven wire, and the top 36 inches high will be barbed wire. All corners will be braced with an H-type brace. The fence construction will be on cut or undisturbed surface. Water in reserve pits may be toxic and unsuitable for consumption by animals. Big game and livestock may become trapped in reserve pits when attempting to use them. Fencing will minimize these problems.

Geophysical Standard Design Practices

The following practices might be applied primarily to geophysical projects, as appropriate:

1. The operator will furnish a map with the Notice of Intent showing approximate line to be used. A map will also be filed with the Notice of Completion showing the completed line. The map will be of a minimum scale of 1/2 inch equals 1 mile. This delineates proposed and actual disturbed areas so that adequate compliance work can be done.
2. Rehabilitation of disturbed areas is to be done concurrent with the geophysical operations.

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This helps to reduce long term and residual impacts.

3. Blasting or vibrating within 1/8 mile of federally-owned or controlled springs and flowing water wells must be approved in writing by the area manager. This helps to reduce possibilities of impacting springs and wells.
4. The operator will avoid any operations when the ground is wet. The area manager may prohibit exploration, drilling, or other activities during wet or heavy snow periods. This helps to avoid unnecessary soil and vegetation damage.
5. Plugging of drill holes will conform to the Colorado Reclamation Standards Abandoned Drill Holes Act. Drill hole cuttings will be returned to the hole. This prevents mixing, or pollution of aquifers, eliminates potential safety hazard of open holes, and eliminates unsightly piles of cuttings on the surface.
5. Any hole proposed for ground water monitoring must be completed and cemented so as to isolate all aquifer intervals which show significant head differences or changes in water quality in order to prevent mixing of unlike waters. Minable coal beds likewise must be isolated by casing and cement.
6. All drill fluid, foam, cuttings, and water must be contained on the drill site. Portable pits may be used; however, earth pits will be required if large volumes of fluid are encountered. Pits will be pumped out or allowed to dry completely before backfilling. Drill cuttings not returned to the hole shall be buried, hauled away, or scattered in a thin layer so they do not inhibit plant growth.

Coal Exploration Standard Design Practices

The following practices would be applied mostly to coal exploration projects as appropriate. These measures would help to prevent pollution of aquifers and surface water, protect coal resources, and protect surface resources.

1. All drill holes must be plugged with cement through the underground minable coal beds and aquifers for a distance of at least 50 feet above and below the coal beds and aquifers.
2. Holes may be plugged with a mud conditioner subject to the following:
 - a. Drill holes encountering aquifers having artesian flow shall be plugged from bottom to top with a neat cement slurry or, at a minimum, be cemented across to a minimum of 50 feet on either side of the aquifer.
 - b. Other drill holes not plugged with cement shall be plugged with abandonment mud having a 10-second API gel strength of at least 20 pounds per 100 square feet and a filtrate volume not to exceed 13.5 cc, as determined by accepted procedures. The abandonment mud mix shall have a Marsh Funnel viscosity of at least 20 seconds per quart greater than that of the drilling fluid or at least 55 seconds Marsh Funnel viscosity.
3. All drill holes shall be plugged at the surface with a minimum of 5 feet of cement.
4. Holes must be plugged as soon after drilling as possible.

Power Line Standard Design Practices

The following practices might be applied primarily to power line projects, as appropriate.

1. Unless otherwise agreed upon in writing, power lines shall be constructed according to standards as outlined in *Suggested Practices for Raptor Protection on Power Lines*, Raptor Research Foundation, Inc., 1981. Industry officials shall assume the burden and expense of proving that pole designs not shown in publications are eagle safe. Such proof shall be provided by a raptor expert approved by the authorized officer. The BLM reserves the right to require modifications or additions to all power line structures placed on this right-of-way, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions shall be made by the holder without liability or expense to the BLM. This prevents electrocution of raptors.
2. Holder shall coordinate with the authorized officer on the design and color of the poles and transmission line to achieve the minimum practicable visual impacts. This will reduce impacts to visual resources.
3. Structure holes left open overnight shall be covered. Covers shall be secure and strong enough to prevent livestock or wildlife from falling into holes. This reduces the safety hazard associated with open holes.
4. Holder shall not blade or excavate to prepare a structure framing pad. If a structure cannot be framed on the natural ground, aerial framing or off-site framing will be necessary. This reduces unnecessary surface disturbance.

Standard Design Practices

STANDARD DESIGN PRACTICES APPLICABLE UNDER SPECIFIC ALTERNATIVES

Table C-1. Standard Design Practices Under Specific Alternatives

Standard Design Practice	CCMA	CA	ProA	PA
General				
(Fill in depth) inches of topsoil will be stripped and stockpiled. Stockpiled topsoil will be evenly distributed over the distributed area prior to seeding. No topsoil stripping will be allowed when soils are moisture saturated or frozen to a depth of 3 inches. This improves the chances of achieving revegetation.	X		X	X
All disturbed areas will be contoured to blend with the natural topography. This reduces the visual impacts, but increases costs. Blending is defined as reducing form, line, and color contrast associated with the surface disturbance so that the project area will fit into the natural landscape as much as possible.	X			X
All disturbed areas will be contoured to match the original natural topography. This minimizes visual impacts, but may greatly increase costs. Matching is defined as reproducing the original topography of the disturbed area and eliminating form, line, and color contrast as much as possible.			X	X
Roads will be designed and maintained to BLM road standards. All vehicle travel will be within the approved driving surface. This will improve road quality, reduce erosion and safety hazards, but may increase costs.	X		X	X
During periods critical to deer, elk, and wild horses the following restrictions will be applied: (1) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip.	X		X	X
On sites where poor quality topsoil prevents establishing an acceptable vegetative cover, enough good quality topsoil to cover disturbed areas 6 inches deep will be hauled in and distributed. This will improve the chances of establishing adequate vegetation but may significantly increase costs.			X	X
The amount of rock greater than 2 inches in diameter present in the upper 6 inches of the replaced topsoil will not exceed the amount present prior to disturbance. Excess rock must be removed to an approved disposal site. This will reduce impacts to the soil quality, visual resources, and improve the chances of establishing acceptable vegetation but will increase reclamation costs.			X	X
Livestock and wildlife forage lost due to disturbance will be replaced through vegetation treatments or manipulations to improve production.			X	
All sewage and human waste will be removed from the site and taken to an approved disposal facility. No such wastes will be disposed of on site, or in bore holes. This will slightly increase costs of drilling, but will prevent ground water pollution, and safety hazards associated with bore holes.			X	X
Where woodland or forest vegetation was present prior to disturbance, tree species will be reestablished. Pinyon and juniper will be included in the seed mixture; Douglas fir and ponderosa pine seedlings will be planted as directed by the authorized officer. This will help to maintain the forestry resource, but will slightly increase reclamation costs.			X	X
Surface disturbing activities will avoid areas of unstable or slumping soils, and slopes greater than 40%. Exceptions to this must be approved by the area manager. This will help to reduce the excessive soil, water, and vegetation damage associated with unstable soils and steep slopes.			X	X
Pipelines				
All pipelines will follow the existing well access routes. No cross country installation will be permitted. This will minimize surface disturbance, vegetation loss, and soil erosion, but may increase costs.			X	

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Table C-1. Standard Design Practices Under Specific Alternatives—Continued

Standard Design Practice	CCMA	CA	ProA	PA
Oil and Gas Drilling				
All plugging and casing programs will be scheduled so that a BLM representative can be present to witness the operations. This will ensure compliance with APD stipulations, but may cause scheduling problems.			X	
Waste drilling fluids and cuttings will be contained in a fabricated pit and removed from the site to an approved disposal facility. No earthen pits will be used, or waste materials disposed of on the site. This will reduce impacts from waste disposal, but will significantly increase drilling costs.			X	
Reserve pit fluids and/or mud will be removed and taken to an approved disposal facility within 60 days after a well is drilled. Pits will be filled and recontoured within 90 days after a well is drilled. This will minimize safety and environmental problems related to reserve pits, and will reduce the amount of time to fill and recontour pits. It may significantly increase drilling expenses.			X	¹ X
Reserve pits will be allowed to dry through natural evaporation for up to 1 year after the well is drilled. If a pit has not dried by the end of this period, all remaining fluids and/or mud must be removed and disposed of in an approved manner. The pit must be filled and recontoured within 15 months after the well is drilled. This will allow a reasonable time period for the pits to dry naturally, but should reduce the number of pits which remain open for long periods of time.				X
The reserve pit will be constructed so that leaking or breaching problems are minimized, and reclamation potential is maximized. At least 50 percent of the pit capacity should be in cut material. When fractured rock, or pourous materials are encountered, the reserve pit will be lined with bentonite, or an impermeable membrane to prevent leakage. Pits will be allowed to dry before backfilling. This helps to reduce impacts from reserve pit disposal on site.	X	X		X
Casing and cementing programs will be adjusted to eliminate any potential influence of the well bore or productive hydrocarbon zones on the coal resource to a depth of 3,000 feet. Surface casing program may require adjustment for protection of fresh water aquifers. All coal zones or coal beds encountered to depth of 3,000 feet shall be sealed off by cementing through the coal bed, and for 50 feet above and below each coal bed. All water aquifers shall also be cemented off for a distance of 50 feet on each side and through the aquifer itself. Drill logs and location maps shall be furnished to the chief, Branch of Solid Minerals, Grand Junction, where coal beds have been encountered and logs show the penetration of such beds. Additional logs of cuttings through any potential coal zone shall be provided. This allows operators flexibility in protecting coal and water, but may not adequately protect coal and water resources.		X		
A full column of cement shall be placed from a depth of 3,000 feet to the surface in order to ensure adequate protection of any usable water sands and coal resources which may be encountered. If after, reviewing the appropriate logs you determine that there are no usable water sands or coal zones of at least 28 inch thickness to 500 feet or 48 inches thickness from 500 to 3,000 feet or that an alternate casing and cementing program will provide satisfactory protection, contact one of the BLM representatives listed in your standard Conditions of Approval and request a verbal waiver or modification or modification of this cementing requirement. Should an operator seek a waiver based on data from offsetting wells, this information and justification must be submitted to the District Office for review and approval prior to the particular cementing procedure taking place. It is recommended that this submittal occur at the same time as the APD is submitted in order that delays may be avoided. This provides maximum protection for coal and fresh water, but may greatly increase plugging costs.	X		X	X

Standard Design Practices

Table C-1. Standard Design Practices Under Specific Alternatives—Continued

Standard Design Practice	CCMA	CA	ProA	PA
A permanent monument is required for each abandoned well. The marker must be at least 4-inch pipe, 10 feet long with 4 feet above ground and embedded in cement. The pipe must be capped and the well identified and location permanently inscribed. The monument should be placed directly over or as near directly over the original well bore as possible. This provides a permanent, easily visible marker of abandoned wells. The size of the marker results in a slight to moderate visual impairment.	X	X		
The abandonment marker must be 4-inch diameter pipe, 3 feet long with not more than 1 foot above ground and embedded in concrete. The pipe must be capped with a steel plate which has the well identity and location permanently inscribed. The marker should be placed directly over or as near directly over the original well as possible. This provides a permanent marker of abandoned wells, but will not result in visual impairment.			X	X
Geophysical				
Blading and dirt work will not be allowed. This will minimize surface disturbance, vegetation loss and soil erosion, but may increase costs and restrict ability to obtain data.			X	
No blading or other dirt work will be allowed without written permission from the area manager. This helps minimize unnecessary surface disturbance, vegetation loss, and soil erosion.	X	X		X

¹This will be applied to visually sensitive areas and WSAs.

APPENDIX D

METHODOLOGY USED IN IDENTIFYING AREAS ACCEPTABLE FOR FURTHER COAL LEASING CONSIDERATION

Four screens, required by 43 CFR 3420-1, are applied during land use planning. The screens are applied to determine which coal lands should be considered for leasing. The first screen eliminates from coal leasing lands that have little or no coal leasing development potential. The second screen (coal unsuitability review) eliminates lands that contain sensitive resources. The third screen (multiple use tradeoffs) eliminates lands that contain resources considered more important than coal. And the fourth screen (surface owner consultation) eliminates private land containing federal coal based on the landowners' opposition to mining.

In the Grand Junction Planning Area, only the first three screens were applied. The fourth screen was not applied as it is only required when coal lands are to be surface mined. Using present technology, lands in the Grand Junction Planning Area would be mined by underground mining techniques in areas not previously leased.

Lands found acceptable in this RMP will be considered for coal leasing by the Uintah-Southwestern Utah Regional Coal Team. The coal team and the Secretary of the Interior will then decide whether or not to offer for lease in the Uintah-Southwestern Utah coal sale any of the lands found acceptable in this RMP.

COAL DEVELOPMENT POTENTIAL (SCREEN 1)

A total of 364,489 acres were identified as having coal development potential based on (1) BLM estimates of the amount of recoverable coal and (2) information from coal companies and state and local governments. This does not include 41,391 acres currently under lease.

The lands with coal resource development potential in the Grand Junction Planning Area are located in the Book Cliff and Grand Mesa Coal Fields. The townships involved are listed below:

Sixth Principal Meridian: T. 5 S., Rs. 100-103 W.; T. 6 S., Rs. 101-105 W.; T. 7 S., Rs. 100-105 W.; T. 8 S., Rs. 99-105 W.; T. 9 S., Rs. 97-

100 W.; T. 10 S., Rs. 97-100 W.; T. 11 S., Rs. 97-98 W.

Ute Principal Meridian: T. 1 N., R.1 E.

COAL UNSUITABILITY REVIEW (SCREEN 2)

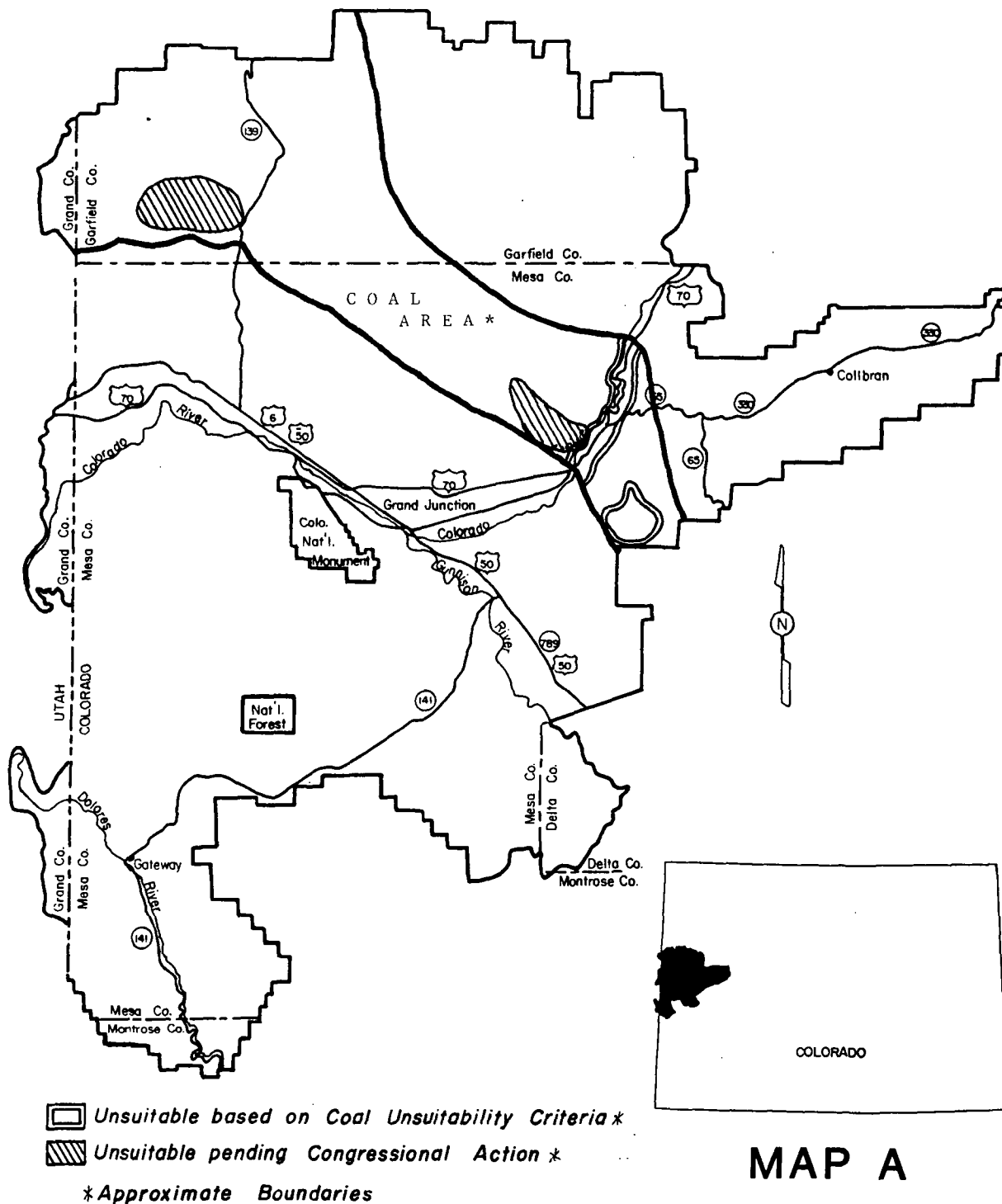
The coal unsuitability review, required by the *Surface Mining Control and Reclamation Act* of 1977, involved the application of 20 criteria with exemptions and exceptions. The criteria, defined in 43 CFR 3461.1 were applied to both federal and private lands overlying federal coal. The exceptions were applied where appropriate. The exemptions were determined to be inappropriate. In the Grand Junction Planning Area, the current method of mining is underground mining. Therefore, the potential coal development area was assessed for suitability for underground mining only.

The best available data were used in the application of the criteria. With the exception of Criterion 17 (municipal watersheds), the data were determined to be satisfactory. A study of hydrologic resources within the Palisade municipal watershed will be conducted in the near future to, among other things, define the municipal watershed boundary and determine potential effects of underground mining on water quantity. The results of this study might indicate that the area could be suitable for further coal leasing consideration. Should this happen, the watershed will be reevaluated for multiple use management and coal leasing.

Based on application of the criteria, 304,970 acres were found suitable for further leasing consideration. Approximately 162,658 acres were found suitable for leasing but sensitive to development, and 59,519 acres were found unsuitable. Of the acres found unsuitable, 45,419 acres (Little Book Cliffs Wild Horse Range and Demaree Canyon Wilderness Study Areas) were found unsuitable pending Congressional action on wilderness recommendations (Map A). These lands could become available for leasing following Congressional action on wilderness recommendations. Table D-1 lists the areas found unsuitable and sensitive.

GRAND JUNCTION PLANNING AREA

Application of Coal Unsuitability Criteria



Coal Methodology

Table D-1. Areas Found Unsuitable and Sensitive

Crite- rion	Leasing Category (Acres)		Reason for Leasing Category
	Unsuit- able	Sensitive	
2	0	unknown	Rights-of-way routes
	0	620	R&PP lease
	40	0	FAA communication site ¹
3	0	128.5 miles	Public roads
	4,100	0	Colorado River corridor
4	45,419	0	Wilderness study areas ²
7	0	9,100	Cultural sites
9	0	23,859	Threatened and endangered wildlife habitat
10	0	23,859	State threatened wildlife habitat ³
11	0	7,191	Golden eagle habitat ⁴
13	0	1,720	Prairie falcon nest sites ⁴
14	0	139	Migratory species of high federal interest ⁵
15	0	119,548	Resident species of high federal interest ⁵
16	0	0	100-year flood plains (Colorado River corridor)
17	10,000	0	Palisade municipal watershed
19	0	2,400	Alluvial valley floors
Total	59,519	¹ 162,658	

¹These acres are included in criterion 17.

²WSAs are unsuitable pending Congressional action on wilderness recommendations. WSAs not designated as wilderness by Congress could be considered for leasing at a later date.

³These acres are included in criterion 9.

⁴Includes 120 acres of overlap.

⁵Includes 1,700 acres of overlap between critical deer and elk winter ranges.

⁶Same acreage as Colorado River Corridor (criterion 3).

⁷This total excludes rights-of-ways (criterion 2) and public roads (criterion 3).

Analysis of the Unsuitability Criteria

Note: Exemptions to criteria are not listed here. Exceptions to criteria are listed where applicable.

Criterion 1

All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, national forests, and Federal lands in incorporated cities, towns, and villages.

Exceptions. (i) A lease may be issued within the boundaries of any National Forest if the Secretary finds no significant recreational, timber, economic or other values which may be incompatible with the lease; and (A) surface operations and impacts are incident to an underground coal mine, or (B) where the Secretary of Agriculture determines, with respect to lands which do not have significant forest cover within those National Forests west of the

100th meridian, that surface mining may be in compliance with the *Multiple-Use Sustained-Yield Act* of 1960, the *Federal Coal Leasing Amendments Act* of 1976 and the *Surface Mining Control and Reclamations Act* of 1977. (ii) A lease may be issued within the Custer National Forest with the consent of the Department of Agriculture as long as no surface coal mining operations are permitted.

Analysis. No lands within these systems or categories are contained in the potential coal development area. Based upon this criterion, all lands are considered suitable for further leasing consideration.

Criterion 2

Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, or for agricultural crop production on federally-owned surface shall be considered unsuitable.

Exceptions. A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that: (i) All or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or (ii) The right-of-way or

Appendix D

easement was granted for mining purposes; or (iii) The right-of-way or easement was issued for a purpose for which it is not being used; or (iv) The parties involved in the right-of-way or easement agree, in writing, to leasing; or (v) It is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stipulations.

Analysis. Numerous rights-of-way are present within the potential coal development area. The lands within these rights-of-way are suitable for leasing but sensitive to development. A no surface disturbance restriction will be required to protect these rights-of-way from surface damage. Table D-2 is a listing of major rights-of-way (6 inch diameter or greater pipeline and 230 KV power line).

Table D-2. Sensitive Rights-of-Way Within Potential Coal Development Areas

General Location	Right-of-Way No.	Company
Pipelines (Existing)		
Baxter Pass/West Salt Creek	C-17977	Western Slope Gas Company
	C-012469	Wesco Pipe Line
	C-029008	Western Slope Gas Company
	C-29366	Mid-America Pipeline Company
Douglas Pass	C-011243	Northwest Pipeline Corporation
	C-05006	Western Slope Gas Company
	C-22771	Northwest Pipeline Corporation
	C-029008	Western Slope Gas Company
South Canyon Calf Canyon/Hay Canyon	C-25378	Northwest Pipeline Corporation
	C-31007	Northwest Pipeline Corporation
	C-31078	Northwest Pipeline Corporation
	C-05006	Western Slope Gas Company
Pipelines (Proposed)		
Calf Canyon/Hay Canyon	C-35204	Parachute Pipeline Company
	C-36812	Shell Pipe Line Corporation
Power Lines (Pending)		
Coal Canyon and Book Cliffs Colorado River Corridor	C-38521	Public Service Company of Colorado
	C-29243	Public Service Company of Colorado

A 40-acre tract on Lands End, being used as a communication site, is withdrawn for the Federal Aviation Administration (FAA). This 40-acre tract is unsuitable for leasing, and it is within the Palisade municipal watershed.

Recreation and Public Purposes (R&PP) Lease C-18227 for the Mesa County Gun Range is adjacent to the potential coal area. The public land adjacent to the R&PP lease (620 acres) is suitable for leasing but sensitive to development. A no surface occupancy restriction will be required to protect the R&PP lease.

Criterion 3

Federal lands affected by Section 522(c), (4), and (5) of the *Surface Mining Control and Reclamation Act* of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public highway or within 100 feet of a cemetery, or within 300 feet of any occupied public building, school, church, community or

institutional building or public park or within 300 feet of an occupied building.

Exceptions. A lease may be issued for lands: (i) Used as mine access roads or haulage roads that join the right-of-way for a public road; (ii) For which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated; (iii) If, after public notice and opportunity for public hearing in the locality, a written finding is made by the authorized officer that the interests of the public and the landowners affected by mining within 100 feet of a public road will be protected.

Analysis. Interstate 70, on the east side of the Colorado River, and the Denver and Rio Grande Western Railroad, on the west side of the Colorado River, including the lands within 100 feet of the outside line of both rights-of-way, are unsuitable for leasing. The entire Colorado River corridor is thus unsuitable for leasing.

The Colorado River corridor (De Beque Canyon) is a strategic location for the placement of surface facilities. If surface facilities were denied within this corridor, coal in adjacent areas could not be mined.

Coal Methodology

Therefore, the Colorado River corridor will be available for the placement of coal surface facilities.

Public roads, occupying approximately 128.5 miles of public land within the potential coal development area, are suitable for leasing but sensitive to development. A lease stipulation will be required to protect these roads from subsidence.

No known cemeteries, public buildings, schools, churches, community or institutional buildings, public parks, or occupied dwellings are on federal lands (surface) within the potential coal development area.

Criterion 4

Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation.

Analysis. The Demaree Canyon (21,050 acres) and Little Book Cliffs Wild Horse Range (26,525 acres) WSAs are both within the Book Cliffs potential coal development area. Of these 47,575 acres, 2,156 acres are currently under coal lease. An estimated 277 million tons of in-place coal underlies the Demaree Canyon WSA, and an estimated 349 million tons of in-place coal underlies the Little Book Cliffs WSA. Both areas are unsuitable pending Congressional decisions on wilderness recommendations. (This determination is based on Section 308 of the FY 84 *Interior Appropriations Act* which prohibits leasing.) Wilderness study areas could become suitable if Congress does not designate them as wilderness.

Criterion 5

Scenic Federal lands designated by visual resource management analysis as Class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the *National Register of Natural Landmarks* shall be considered unsuitable. A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

Analysis. No areas of federal land are presently designated as VRM Class I within the area under consideration.

Criterion 6

Federal lands under permit by the surface management agency, and being used for scientific studies involving food or fiber production, natural re-

sources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstrations or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

Analysis. No lands within the potential coal development area are under permit for scientific study.

Criterion 7

All publicly owned places on Federal lands which are included in the *National Register of Historic Places* shall be considered unsuitable. This shall include any areas that the surface management agency determines, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office, are necessary to protect the inherent values of the property that made it eligible for listing in the *National Register*.

Exceptions. All or certain stipulated methods of coal mining may be allowed if the surface management agency determines, after consultation with the Advisory Council on Historic Preservation and State Historic Preservation Office that the direct and indirect effects of mining, as stipulated, on a property in or eligible for the *National Register of Historic Places* will not result in significant adverse impacts to the property.

Analysis. Fifty-four cultural resource sites are considered eligible or likely to be eligible for the *National Register of Historic Places* (NRHP), and one region has been proposed for nomination to the NRHP as an archaeological district. These areas are suitable for leasing but sensitive to development.

All areas of direct impact resulting from underground mining (including areas of suspected subsidence) and associated surface facilities will require a 100 percent pedestrian survey (Class III) to locate cultural resources. Consultation with the State Historic Preservation Officer will be required on located resources prior to approving any surface-disturbing activities. Any existing and newly-discovered sites will be identified and avoided or protected by other means.

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Criterion 8

Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

Exceptions. A lease may be issued and mining operation approved in an area or site if the surface management agency determines that: (i) With the concurrence of the state, the area or site is of regional or local significance only; (ii) The use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or (iii) The mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites).

Analysis. No natural areas or national natural landmarks are designated within the potential coal development area.

Criterion 9

Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

Exceptions. A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat.

Analysis. Of the eight species listed as threatened or endangered in this region (Grand Junction District), seven have a visible potential to be adversely impacted by coal mining. These are the peregrine falcon, bald eagle, whooping crane, black-footed ferret, the Colorado River squawfish, humpback chub, and the Uinta Basin hookless cactus. Habitats containing these species are suitable for leasing but sensitive to development. If these named species or any others are found subsequent to this review to make substantial use of lands within the potential coal development area, stipulations will be required to protect them. To protect the bald eagle, squawfish, chub, and cactus:

1. No surface facilities will be allowed within the Colorado River riparian zone without prior approval from the authorized BLM officer.
2. Critical habitat area that would be impacted by surface facilities outlined in mine plan will be surveyed prior to mine plan approval. The mine

plan will incorporate avoidance of the cactus sites.

See Criterion 13 for protection of peregrine falcons.

Criterion 10

Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

Exception. A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

Analysis. The species present are bald eagle, peregrine falcon, greater sandhill and whooping crane, razorback sucker, Colorado River squawfish, and humpback chub. The habitat of these species are suitable for leasing but sensitive to development. Stipulation will be required as needed to protect the habitat of these species from subsidence and surface occupancy impacts.

In addition, to protect the bald eagle and three river fishes that make substantial use of the potential coal development area, no surface facilities will be allowed within the Colorado River riparian zone without prior approval from the authorized BLM officer.

Criterion 11

A bald or golden eagle nest or site on Federal lands that is determined to be active and an appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

Exceptions. A lease may be issued if (i) It can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or (ii) The surface management agency, with the concurrence of the Fish and Wildlife Service, determines that the golden eagle nest(s) will be moved; (iii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected.

Analysis. Several golden eagles nest within the potential coal development area, mostly along the Book Cliffs. Golden eagle habitat is suitable for

Coal Methodology

leasing but sensitive to development. To protect golden eagles:

1. An approximate one-quarter mile buffer zone will be delineated around all active golden eagle nests (Snow 1973). Actual buffer zones will be determined through consultation with the U.S. Fish and Wildlife Service.
2. No surface activities associated with the construction of mine features will be allowed within the zones between December 15 and July 15.
3. No surface facilities which require daily human activities shall be built within active areas or within buffer zones with active nests.
4. The mine surface facilities within the buffer zone must be designed to not impair the site for nesting golden eagles and must be approved by the authorized BLM officer.

Criterion 12

Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

Exception. A lease may be issued if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed.

Analysis. Some bald eagle roosting activity takes place at the upper end of the Colorado River within the potential coal development area. This roosting area is suitable for leasing but sensitive to development. If the use changes and bald eagle roosting-site needs become apparent prior to leasing, a winter seasonal restriction may be placed on development.

Criterion 13

Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of Federal land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey; species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

Exception. A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the falcon habitat during the periods when such habitat is used by the falcons.

Analysis. Prairie falcons nest within the potential coal development area, primarily along the Book Cliffs. These areas are suitable for leasing but sensitive to development. Peregrine falcons do not presently nest within the review area. No surface activities shall be allowed within one-quarter mile of an active prairie or peregrine falcon nest between February 15 and July 15.

Criterion 14

Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

Exception. A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

Analysis. Nine species on the list of migratory species of high federal interest are known to breed within or near the potential coal development area. These are the western bluebird, golden eagle, prairie falcon, Cooper's hawk, great blue heron, Scott's oriole, burrowing and flammulated owl, Williamson's sapsucker, long-billed curlew, ferruginous hawks, band-tailed pigeons and Lewis' woodpeckers. The habitat of these migratory bird species is suitable for leasing but sensitive to development. To protect migratory bird species:

1. No surface facilities will be allowed within the Colorado River riparian zone without prior approval from the authorized BLM officer.
2. The lessee will survey the leased area for use by the above species to determine habitat that would be impacted by surface facilities outlined in mine plan prior to mine plan approval.

Criterion 15

Federal land which the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include:

- (i) Active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken;

Appendix D

(ii) Winter ranges most critical for deer, antelope, and elk; and

(iii) Migration corridors for elk.

Analysis. A lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.

Analysis. There are 10 game, 3 furbearer, and 13 or 14 nongame species within the coal resource area that have been identified as high interest residents. These are elk, mule deer, black bear, puma, cottontail, sage grouse, turkey, Gambel's quail, brook and rainbow trout, bobcat, ringtail, beaver, pinyon mouse, sagebrush vole, western jumping mouse, southern red-backed vole, great blue heron, three-toed woodpecker, Lewis's woodpecker, pinyon jay, bushtit, plain titmouse, Bewick's wren, mountain bluebird, pine grosbeak, and possibly pika. Habitat of these species is suitable for leasing but sensitive to development.

Surface occupancy within deer and elk critical winter range and construction or daily activity within elk calving areas will be allowed only if no reasonable alternative sites exist outside the critical habitat. Lease stipulations as determined by BLM and the Colorado Division of Wildlife will be required to minimize disturbance within the critical habitats. Special protective emphasis will be given to activities between December 1 and May 1 on the critical winter ranges and between May 15 and June 15 within the calving areas.

One or more of the following stipulations will be required to protect perennial streams and associated riparian vegetation:

1. Appropriate buffer strips under perennial streams to protect against subsidence.
2. Appropriate siting of roads, surface facilities, etc., to protect these areas (especially avoidance, if possible).
3. Proper culvert sizing and installation to avoid channel erosion.
4. Proper control of mine site drainage to avoid polluting the stream or causing downcutting through increased runoff.
5. Avoidance of opening underground areas which would cause rerouting of underground water (springs, etc.) which feed the streams and riparian areas.

Criterion 16

Federal lands in riverine, coastal and special flood plains (100-year recurrence interval) on which

the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.

Analysis. No coastal flood plains exist in the potential coal lease areas. One hundred year flood plains exist along the drainages in the potential coal development area, but only the Colorado River has been delineated. The entire Colorado River corridor has been identified unsuitable (see Criterion 3). However, it is available for placement of surface facilities. Mine plans must consider the effects of mine operations on adjacent flood plains and mitigate impacts.

Criterion 17

Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

Exception. A lease may be issued where the surface management agency in consultation with the municipality (incorporated entity) or the responsible governmental unit determines, as a result of studies, that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree.

Analysis. The Palisade municipal watershed is within the potential coal lease area and encompasses the Rapid Creek watershed. Presently the lower part of the watershed is leased for coal. The upper part, containing Palisade's reservoirs and collection systems, has not been leased. Much of Palisade's water supply is derived from springs filtering through fractures in the basalts on the Grand Mesa. Underground coal mining through subsidence or direct interception might cause these waters to reroute away from their present locations. This could cause a serious impact on Palisade's water supply. The coal beds are well below ground in the area, but the fracture system supplying these springs is not well understood. These fractures are probably deep-lying, and even subsidence that didn't reach the surface could impact them. Thus, all of the area that feeds Palisade's water system is unsuitable for leasing, pending further study of the area's hydrologic system. This would take approximately 10,000 acres of land out of the potential coal lease area, most of which is private surface, federal minerals.

The town of Palisade supports no coal leasing in the area where they obtain their water supplies. They have no objections to coal leasing in the lower part of their watershed as long as the coal company is responsible for any damage to their pipelines.

Coal Methodology

Criterion 18

Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands 1/4 mile from the outer edge of the far banks of the water shall be unsuitable.

Exception. The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.

Analysis. No national resource waters have been identified by the State of Colorado in the potential coal lease area.

Criterion 19

Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors according to the definition in 3400.0-5(a) of this title, the standards in *30 CFR Part 822*, the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement when published, and approved state programs under the surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

Analysis. The Office of Surface Mining has tentatively identified the following areas (approximately 2,400 acres) in the potential coal development area as alluvial valley floors (AVFs). Most of these areas are undeveloped rangelands not presently significant to agriculture.

1. The alluvium of West Salt Creek from the headwaters to approximately 2 miles south of the Book Cliffs.
2. The alluvium of East Salt Creek from the headwaters to approximately 2 miles south of the Book Cliffs.
3. The alluvium of Big Salt Wash from the headwaters to approximately 3 miles south of the Book Cliffs.
4. Several subirrigated areas in the headwaters area of Middle Dry Fork, North Dry Fork, McKay Fork, and Kimball Creek.

Tentatively identified alluvial valley floors are suitable for leasing but sensitive to development. Stipulations will be required to ensure water supplies of these areas are not affected by underground coal mining.

Criterion 20

Federal lands in a state to which is applicable a criterion (i) proposed by that state, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.

Exception. A lease may be issued when: (i) Such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft comprehensive land use plan or land use analysis, plan, or supplement to a comprehensive land use plan, for the area in which such land is included, or (ii) After consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the value which the criterion would protect.

Analysis. This criterion does not apply at this time in Colorado.

MULTIPLE USE TRADEOFFS (SCREEN 3)

The multiple use tradeoffs screen was applied as part of the land use conflict resolution process. Where conflicts were identified between coal development and development or protection of other resources, a determination was made as to which resource was more important. Where another resource was more important than coal or potential impacts could not be mitigated, the conflict area was removed from further leasing consideration.

The acreage found acceptable for further coal leasing consideration following screen 3 is presented in Table D-3 by alternative. As shown in the table, the Little Book Cliffs Wild Horse Range is acceptable pending further study under the Commodity and Preferred Alternatives. This study would determine the effects of surface facilities in upper Coal Canyon on the viability of the horse herd. Also presented are the multiple use tradeoffs made under each alternative. Maps B, C, D, and E show locations of areas found unacceptable based on multiple use tradeoffs.

Appendix D

Table D-3. Results of Coal Planning Review

	CCMA	CA	ProA	PA
Acres available for leasing following coal unsuitability review (Screen 2) ¹	350,389	350,389	350,389	350,389
Less acres removed following multiple use tradeoffs (Screen 3):.....	24,421	0	127,252	0
Little Book Cliffs Wild Horse Range	(24,421)	² 0	³	² 0
Little Book Cliffs Wilderness Study Area (WSA)	0	0	³ (26,666)	0
Little Book Cliffs Wild Horse Range Outside the WSA	0	0	³ (9,066)	0
Demaree Canyon WSA	0	0	(22,420)	0
Hunter/Garvey Canyon	0	0	(19,000)	0
Mount Garfield/Grand Mesa	0	0	(9,520)	0
South Shale Ridge	0	0	(22,500)	0
Baxter/Douglas Area	0	0	(18,000)	0
The Goblins.....	0	0	(80)	0
Acres acceptable for further coal leasing consideration following Screen 3	325,968	350,389	223,137	350,389

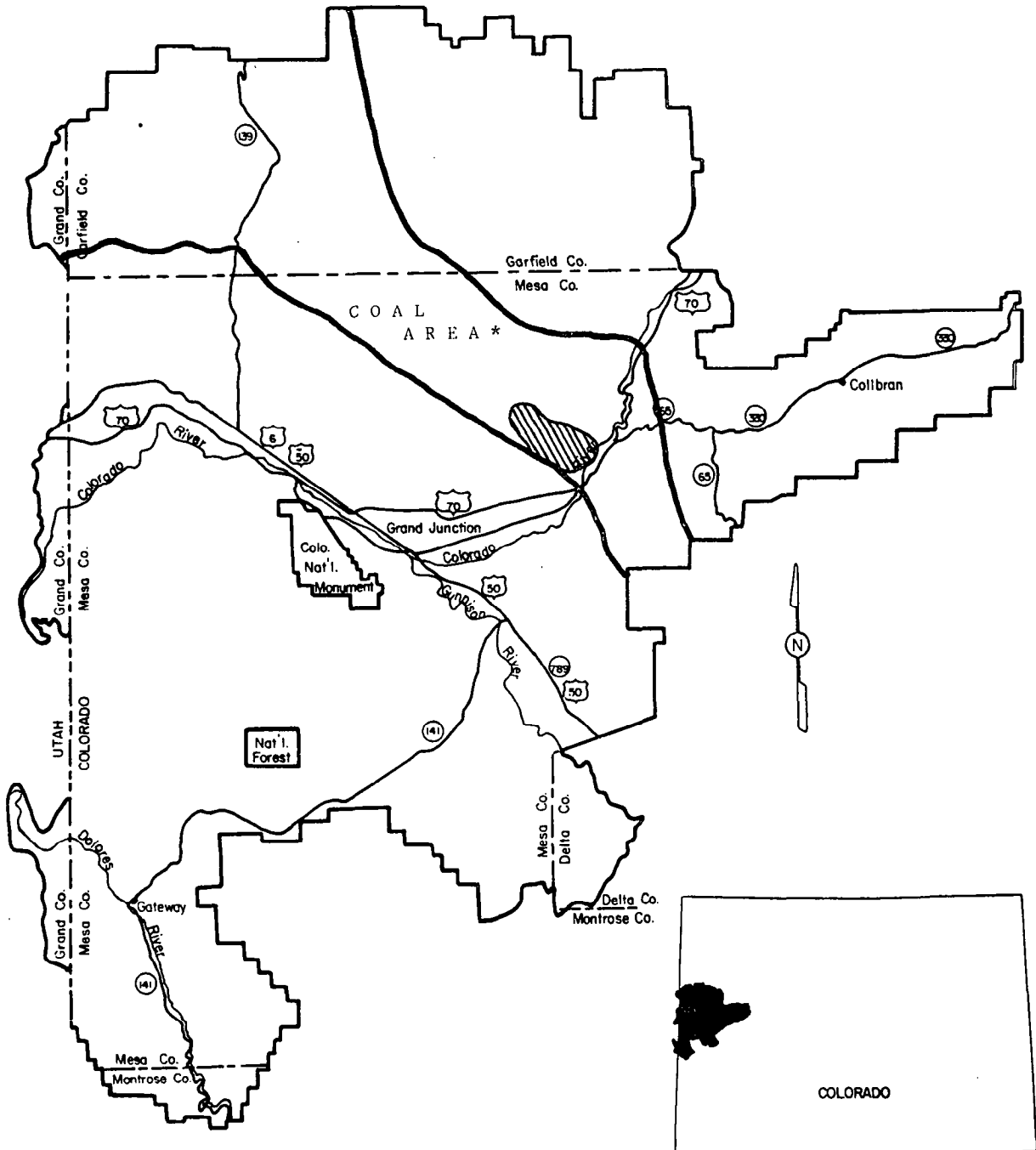
¹All alternatives include two WSAs (45,419 acres) that cannot be considered for leasing until Congress releases them from wilderness review.

²Under these alternatives, the wild horse range would be acceptable pending further study.

³The Little Book Cliffs Wild Horse Range is included in the acreage for the Little Book Cliffs WSA and the Little Book Cliffs Wild Horse Range outside the WSA.

GRAND JUNCTION PLANNING AREA

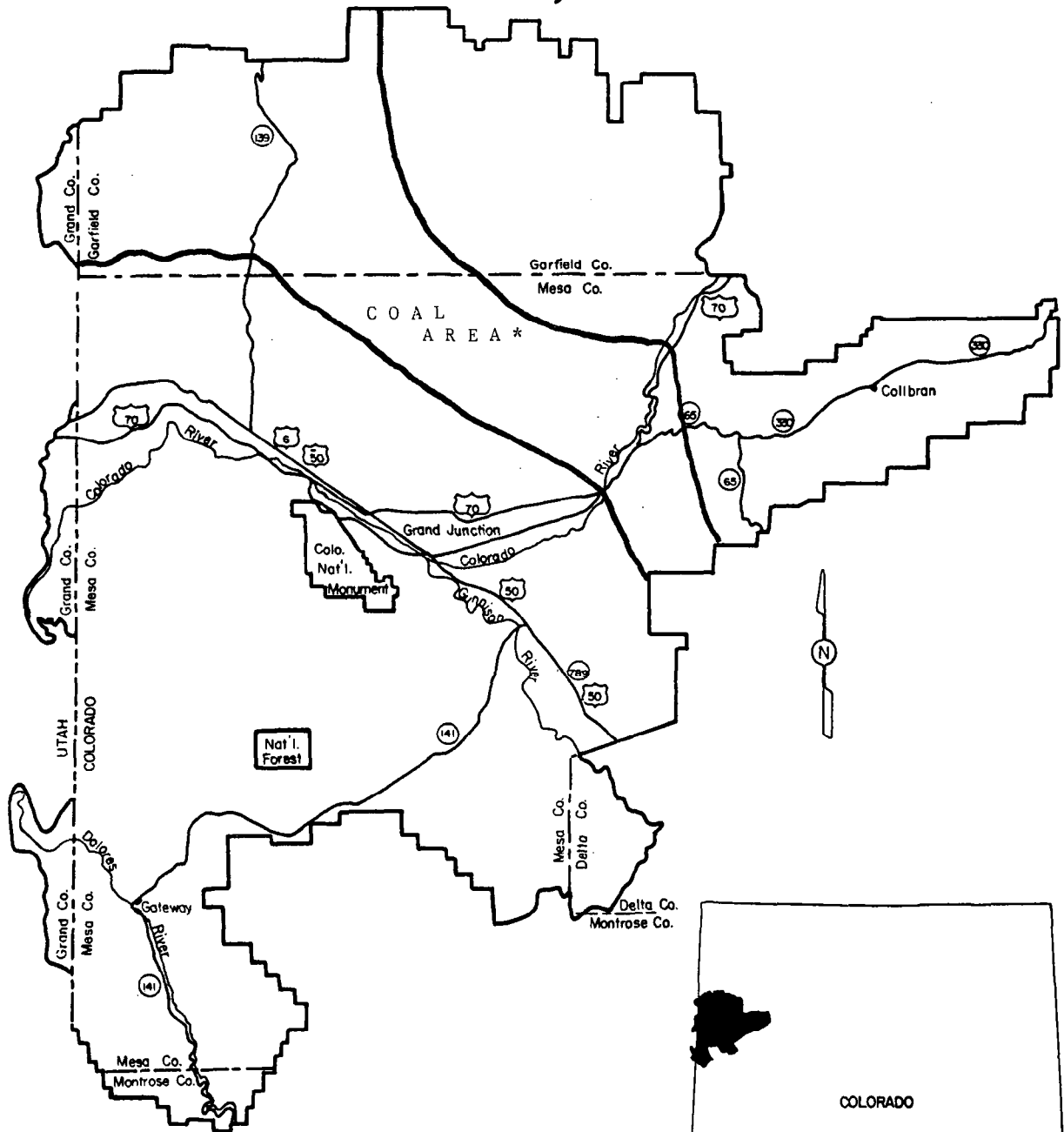
Coal Land Use Allocations
Continuation of Current Management



MAP B

GRAND JUNCTION PLANNING AREA

Coal Land Use Allocations
Commodity Alternative

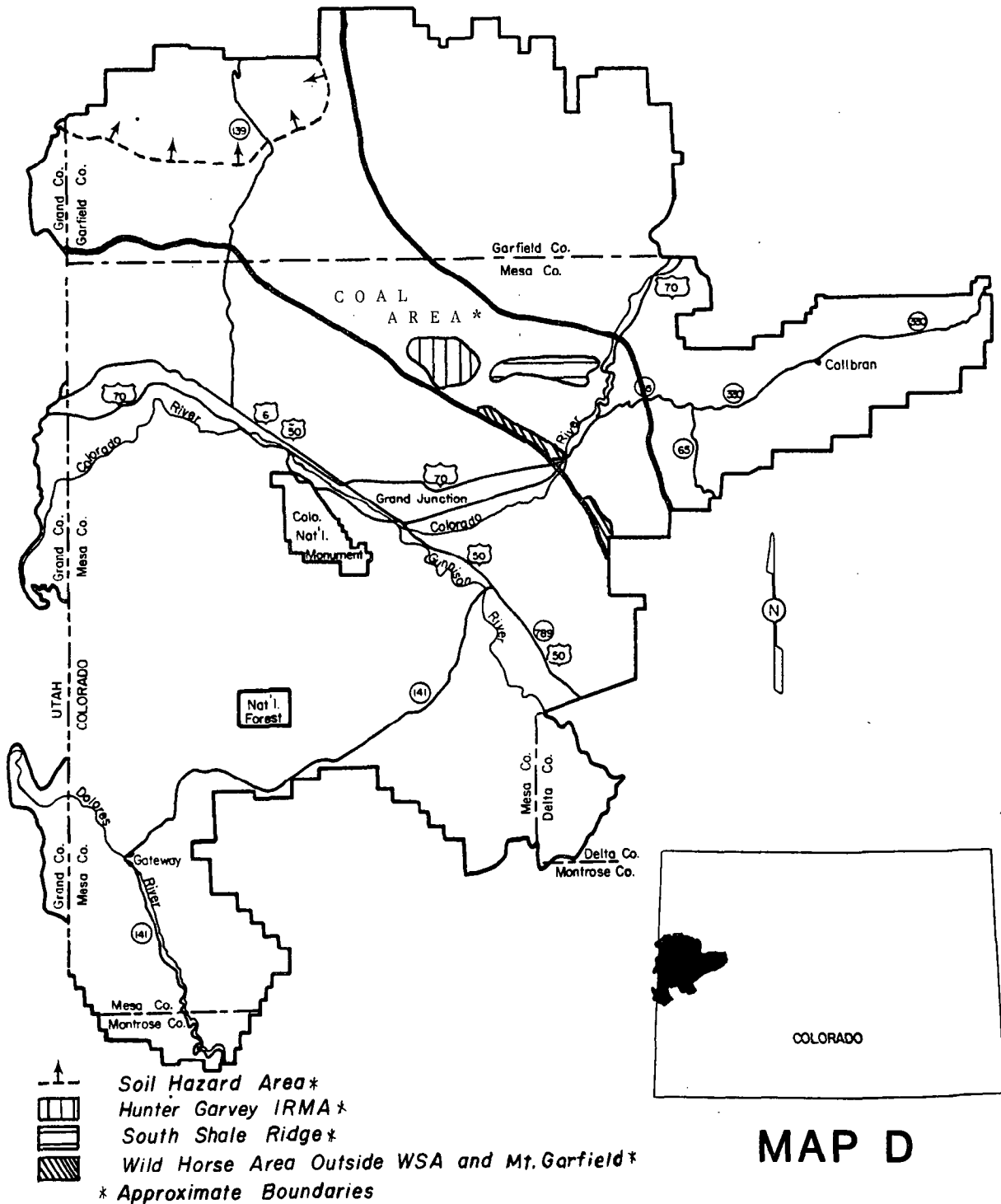


* Approximate Boundary

MAP C

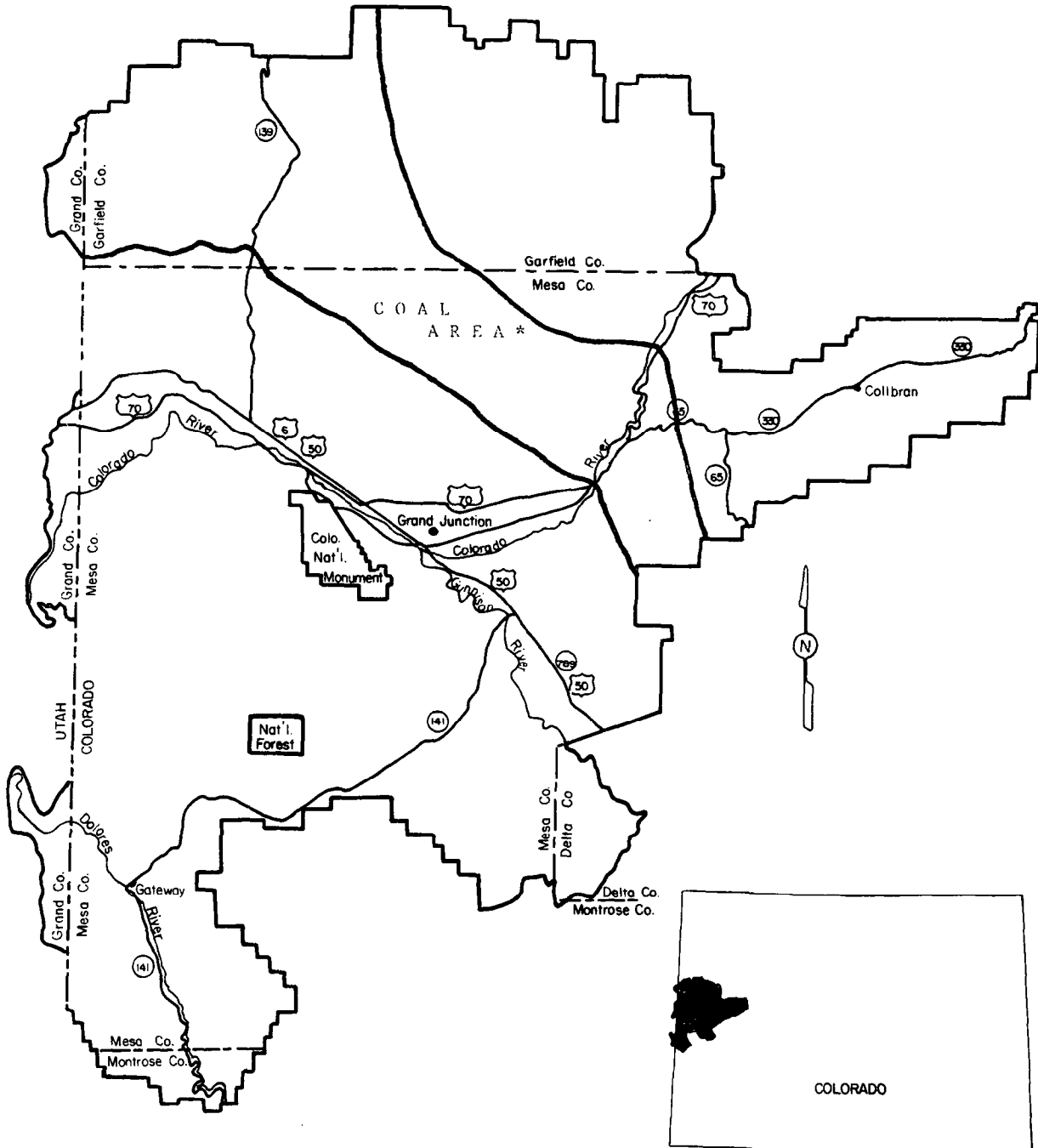
GRAND JUNCTION PLANNING AREA

Coal Land Use Allocations
Protection Alternative



GRAND JUNCTION PLANNING AREA

Coal Land Use Allocations
Preferred Alternative



* Approximate Boundaries

MAP E

APPENDIX E

OIL AND GAS

This oil and gas appendix has been subdivided into four major sections: Section 1 describes development of a typical oil and gas well, Section 2 lists oil and gas stipulations that would be added to future oil and gas leases, Section 3 explains oil and gas leases within wilderness study areas, and Section 4 describes proposed management actions and site specific impacts of developing ten pending applications for permit to drill (APDs).

SECTION 1, DESCRIPTION OF TYPICAL OIL AND GAS WELL PROJECTS

This appendix is a short description of the processes and actions involved in typical oil and gas related projects. The permitting processes for these activities are described in *43 CFR parts 2800, 3045, and 3160*. Projects described are geophysical exploration projects; well drilling, production and abandonment; and oil and gas pipelines.

Geophysical Exploration

Three subsurface characteristics are usually measured by geophysical methods: gravitational field, magnetic field, and seismic characteristics.

Gravity and Magnetics

Gravitational and magnetic surveys involve small portable units that are easily transported via light ground vehicles such as four-by-four pickups and jeeps (some units are airborne). Off-road vehicle traffic is common in these two types of surveys. Sometimes small holes (approximately 1 foot by 2 feet by 2 feet) are hand dug for instrument placement along the survey lines.

Seismic

Seismic lines are the most popular of the geophysical methods and seem to give the most reliable results. A seismic survey is a method of gathering subsurface geological information by recording impulses from an artificially generated shock

wave. The common procedure used in reflection seismic surveys on land consists of creating shock waves and recording, as a function of time, the resultant seismic energy as it arrives at groups of vibration detectors (1/2 to 5 pound seismometers, or jugs, arrayed on the ground at spaced intervals). These arrays of seismometers are connected to a recording truck that receives and records the reflected seismic energy.

The seismic sensors and energy source are located along lines on a 1 to 2 mile grid. Some surveys may be laid out in excess of 40 miles in a series of grid patterns or in a single line.

Where possible, existing roads are used to conduct seismic operations. Some lines may require clearing of vegetation and loose rock to improve access for trucks. Each mile of line cleared to a width of 8 to 14 feet represents disturbance of about an acre of land. Completely clearing a seismic line is unusual. Most lines which run where no roads exist are not bladed except at wash crossings. Vehicles travel over land with a bulldozer towing them through rough spots or in sandy areas.

In remote areas where little is known about the subsurface, a series of short seismic lines may be required to determine the attitude of the subsurface formations. After this, seismic lines will be aligned to make seismic interpretation more accurate. Although alignment may be fairly critical, spacing of the lines can often be changed up to a quarter of a mile on a one mile grid before the results will affect the investigation program. This allows some adjustment for existing or alternate access of lines.

Seismic methods are usually referred to by the various methods of generating the shock wave. A given area may be explored with seismic methods several times by the same or different companies over a long period of time. The following are some of the more common methods. Methods a, b, and c have similar surface disturbing factors. Generally the methods involve travel either on existing roads or off-road with 4 to 5 energy source trucks (usually weighing 2-1/2 to 10 tons) plus the recording truck and cable trucks or pickups). The vehicles may travel off-road along a single two lane trail made by the trucks as the survey progresses. The vehicle may make several parallel trails in an attempt to distribute travel loads over a broader area. Travel along the line (trails) is usually a matter of 1 to 2 passes by the vehicles since the energy source is

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mobile and recording is done as the vehicles move down the line.

a. Thumpers. The thumper method involves dropping a steel slab weighing about 3 tons to the ground several times in succession along a predetermined line. The weight is attached by cables to a crane on a special truck.

b. Vibroseis. The vibrator (or vibroseis) method is widely used and is replacing the explosive method in accessible areas. A typical operation would use three or four large trucks or tractors each equipped with a vibrator mounted between the front and back wheels; four or five support vehicles; and a crew of 10 to 15 people. The vibrator pads (about 4 feet square) are lowered to the ground and vibrators on all trucks are triggered electronically from the recorder truck. After the information is recorded, the trucks move forward a short distance and the process is repeated.

c. Dinoseis. The dinoseis method can be used with a variety of vehicles. Its device consists of a bellshaped chamber mounted underneath a vehicle. The seismic energy is imparted to the ground through the spark ignition of a propane and oxygen mixture confined in the chamber. This method causes little surface damage.

d. Explosives. Historically, explosives have been the most widely used way to generate seismic shock waves. The explosives are used in two different methods: subsurface and surface.

Subsurface Explosives. In the subsurface explosive method, 5 to 20 pounds of explosive charge are detonated at the bottom of a 25 to 200 foot drill hole. The hole is usually 2 to 6 inches in diameter and drilled with a truck-mounted drill. Detonation of the charge in some areas causes no surface disturbance while in other areas a small crater up to 6 feet in diameter is created. Cuttings from the shot hole are scattered by hand near the hole, or put back in the shot hole. The same hole may be reloaded and shot several times to find the depth and charge returning the best signal. State regulations on shot hole plugging can be found in the *Code of Colorado Regulations* (2CCR 407-1 Rule No. 5).

Drilling and shooting are similar to vibroseisers and thumpers in that the drill is transported by truck. However, the trucks used in drilling are usually heavier (15 to 20 tons). As with other truck transported operations, existing roads may be used or trails may be blazed by the drill vehicles and/or a bulldozer. Truck-mounted drill and shot operations generally take longer to complete and require more disturbance than thumper operations. The reason for this is the holes must be drilled, charged, and shot along a relatively long distance compared to vibro and thumpers, as information is not recorded

as the energy transportation system moves along the lines.

Where access limitations, topography, or other restraints prevent use of truck-mounted drill rigs or recording trucks, light weight portable drill equipment can be used. Various kinds of portable drills can be backpacked or delivered by helicopter to the area. These portable operations use a pattern of holes drilled to a depth of about 25 feet. The holes are loaded with explosives and detonated simultaneously.

Surface Explosives. The surface explosive charge method involves the placing of explosives directly on the ground, on snow, or on a variety of stakes and platforms. Paper cones, survey stakes, lathes, or 2 X 4's up to 8 feet in length have been used with varying success in different areas. Use of tall stakes or explosives placed on the surface of deep snow results in good seismic data in some areas, while creating little visible surface disturbance.

Surface explosive methods are very mobile. Generally 4X4 pickups are used for transportation, although the method is adaptable to airborne and pack teams.

Well Drilling

After completing the necessary permitting procedures, construction of the access road and well site can begin. Construction equipment is moved to the construction area over existing county and BLM roads. The equipment generally includes bulldozers, backhoes, and motor graders. Existing roads may need improvements, including crowning and ditching, grade reduction, realignment, culverts, and cattleguards. New road is constructed from the existing road to the well site. Roads are usually constructed with a 16 to 20-foot wide running surface. The amount of surface disturbance from road construction is often significantly greater on steep slopes due to steeper cut and fill slopes.

In general, deeper wells require larger drill rigs, and larger well sites. The site is first cleared of vegetation, and then leveled. A larger disturbed area will result on relatively flat, even terrain.

A pit to contain waste drilling fluids and drill cuttings (reserve pit) is constructed along one side of the levelled area. The dimensions of the pit will vary with the depth of the well, and the method of drilling. Reserve pits vary from about 10 feet by 250 feet by 6 feet deep to 30 feet by 100 feet by 15 feet deep. Deep wells and mud drilled wells usually

Oil and Gas

require a larger reserve pit than shallow wells, and air drilled wells.

The pit may be lined with an impermeable membrane liner or bentonite to prevent leakage, and is fenced in all cases. The drill rig is usually moved on site within one or two weeks after site construction. Ten to 25 truck loads are required to move the rig sections. In some instances, rigs can be skidded short distances in level terrain which will shorten the assembly time.

Drilling is accomplished by rotating a bit at the end of the drill string under pressure. As the bit cuts into the rock, the cuttings are pushed up the hole by compressed air (air drilling) or a mixture of water, clay, and chemical additives, known as mud (mud drilling). Some mud additives are caustic, toxic, or acidic, but such additives are rarely used. The air or mud is pumped down the drill pipe, exits through holes in the bit, and returns to the surface outside the drill pipe. Cuttings, contaminated mud, and waste drilling fluids are contained in the reserve pit. The hole is usually cased with steel pipe, cemented into place. Casing prevents caving of the hole and seals off other formations.

Drilling operations are continuous, 24 hours a day and 7 days a week. Drilling usually lasts from 2 to 30 days, depending upon well depth and problems encountered. From 5,000 to 15,000 gallons of water a day may be needed for mixing drilling mud, cleaning equipment, cooling engines, etc. A surface pipeline may be laid to a stream or a water well, or the water may be trucked to the site from creeks, ponds or streams in the area.

When total depth of the well is reached one or more of the following completion operations must be conducted in most wells: (1) logging, which measures porosity, permeability, and saturation of the formation, (2) drill stem testing, which allows production through the stem for accurate production measures, (3) installing and perforating the production casing to allow production of the formation, and (4) formation stimulation, which is usually fluid fracture or acid dissolving of the formation to increase the flow capacity of the formation. If producible oil and gas is discovered, the well will be shut in until production is desired. When production is desired, production facilities will be installed. If producible amounts of oil and gas are not encountered, the well will be plugged and abandoned.

Well Production

Production activities include installation of production equipment and product treatment facilities, and disposal of produced water.

Production equipment which may be installed includes storage tank batteries, dehydrators, separators, and meters. Tank batteries are used to store produced oil or condensate prior to sale, or produced water, prior to disposal. Dehydrators and separators are used to separate the various petroleum products and remove water. Meters are used to measure the amount of gas produced before it is put into a transmission pipeline. Production equipment is usually housed in small huts or metal buildings.

Product treatment facilities remove impurities from produced gas in order to improve the gas quality to an acceptable level for sales. Hydrogen sulfide and carbon dioxide are the most common impurities removed. Facility sites are about 1 to 10 acres in size. Sites are cleared of vegetation and levelled to provide an industrial building site.

Small amounts of produced water (less than 5 barrels/day) are usually disposed of in small (50 to 200 square foot) evaporation pits on the well site. Larger amounts are usually removed from the site and disposed of by injection into a suitable formation in an injection well, or disposed of in a large evaporation pond facility.

Well Abandonment

Well plugging and abandonment requirements vary with the rock formations, subsurface water, well site, and the well. Generally, however, in a dry borehole, the area below the casing is filled with heavy drilling mud, a cement plug is installed at the bottom of the casing, the casing is filled with heavy mud, and a cement cap is installed on top. A pipe monument giving the location and name of the well is required unless waived. If waived, the casing may be cut off and capped below ground level. Protection of aquifers and known oil and gas producing formations may require placement of additional cement plugs.

In some cases, wells that formerly produced are plugged as soon as they are depleted. In others, depleted wells are not plugged immediately but are allowed to stand idle for possible later use in a secondary recovery program. Truck-mounted equipment is used to plug former producing wells. In addition to the measures required for a dry hole, plugging of a depleted producing well requires a cement plug in the perforated section in the producing zone. If the casing is salvaged, a cement plug is put across the casing stub. Surface flow and injection lines are removed, but buried pipelines are usually left in place and plugged at intervals as a safety measure.

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After plugging, the drill rig is removed and the surface, including the reserve pit and access road, is restored to the requirements of the surface management agency. This may include the use of dozers, graders, backhoes, and draglines to recontour the disturbed area; evaporation or removal of drilling fluids from the reserve pit; spreading of stockpiled topsoil, and seeding with a suitable seed mixture. A fence may be erected to protect the site until revegetation is complete, particularly in livestock concentration areas.

Pipelines

Natural gas pipelines transport gas from the wells (gathering or flow lines) to a trunk line and then to the main transmission line from the area. Flow lines are usually 2 to 4 inches in diameter and may or may not be buried. Trunk lines are generally 6 to 8 inches in diameter and are buried, as are transmission lines which vary in diameter from 10 to 36 inches. The area required to construct a pipeline varies from about 15 feet wide for a 2 to 4 inch surface line to 75 feet or more for the larger diameter transmission lines (24 to 36 inches). Surface disturbance is primarily dependent on size of the line and topography of the area on which the line is being constructed.

The first step in pipeline construction is to clear the right-of-way of any obstacles in the line route such as vegetation and rocks and abrupt surface irregularities. Next, topsoil over the trench location is removed and stockpiled on the side of the trench away from the working side of the trench. Then trenchers or backhoes dig the trench in which the pipe will be laid. The ditch must be deep enough to allow 3 to 5 feet of cover over the pipeline. Fill excavated from the trench can be placed on either side of the trench taking care not to mix it with any topsoil that may be stockpiled.

After the trench is ready, the pipe is laid along side the open trench in separate lengths. The lengths of pipe are either positioned by hand or side boom tractors for welding together.

The welds are inspected, pipe is cleaned, coated with tar, covered with fiberglass, and finally wrapped with tar paper, kraft paper or asbestos felt. The pipe is then lowered into the ditch which is backfilled and compacted. The right-of-way is regraded to the original contour and the topsoil is replaced. Compressor stations may be necessary to increase production pressure to the same level as pipeline pressure. The stations vary in size from approximately 1 acre to as much as 20 acres for a very large compressor system.

SECTION 2, OIL AND GAS LEASE STIPULATIONS

At the discretion of the authorized officer, the following stipulations might be added to any future oil and gas leases issued in areas identified as *Open to Leasing with Stipulations*. They also would be added to applications for permit to drill (APDs) on existing leases to the extent consistent with lease rights. The number and types of stipulations placed on leases or APDs would depend on the resources present in the area (see Chapter 2, Summary of Management Actions).

1. No Surface Occupancy Stipulation

No occupancy or other activity will be allowed on the following portions of this lease: (legal description) to protect (identify sensitive resource).

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

2. Scenic and Natural Values Stipulation

In order to protect the outstanding scenic and natural landscape values of (identify the resource and area) located on the following portions of this lease (legal description), special design and reclamation measures may be required. Surface disturbing activities may be denied in sensitive areas, such as unique geologic features and rock formations, visually prominent areas, and high recreation use areas. Special design and reclamation measures may include transplanting trees and shrubs, fertilization, mulching, special erosion control structures, irrigation, site recontouring to match the original contour, buried tanks and low profile equipment, and painting to minimize visual contrasts.

This stipulation may be waived or reduced in scope if circumstances change or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

3. Steep Slope Stipulation

In order to prevent unacceptable impacts to soil, water, and vegetation resources, no surface disturbing activities will be allowed on slopes greater than 40 percent. The following portions of this lease are affected (legal description).

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

4. Elk Calving Area Stipulation

In order to protect important seasonal wildlife habitat, exploration, drilling, and other development will be allowed only during the period from June 15 to May 15. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer. In addition, no surface disturbing activity will be allowed in aspen stands in order to protect elk calving sites. Affected portions of this lease are: (legal description).

5. Known Cultural Resource Value Stipulation

Important cultural resource values (identify resource values) are present on portions of this lease (legal description). Surface disturbing activities must avoid known cultural sites unless mitigation of impacts is agreed to by the authorized officer. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.

6. Watershed Stipulation

All lease operations will avoid interference with (identify municipal watershed) located on the following portions of this lease (legal description). This may include the relocation of proposed roads, drilling sites and other facilities, or application of appropriate mitigating measures.

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted

without causing unacceptable impacts on the concern(s) identified.

7. Perennial Streams Water Quality Stipulation

In order to reduce impacts to water quality, surface disturbing activities within 100 feet of perennial streams is limited to essential roads and utility crossings. The affected portions of this lease are: (legal description).

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

8. No Surface Disturbance (NSD) Special Stipulation

No surface-disturbing activities will be allowed in the Gunnison Gravels Research Natural Area or the Indian Wash Dam.

9. Bighorn Seasonal Stipulation

In order to protect important seasonal wildlife habitat in the (legal description), exploration, drilling, and other development will be allowed only during the period from May 1 to December 1. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer.

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

10. Wild Horse Winter Range Stipulation

In order to protect important wild horse habitat in the (legal description), exploration, drilling, and other development will be allowed only during the period from May 1 to December 1. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any

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particular year may be specifically approved in writing by the authorized officer.

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

11. Wild Horse Foaling Area Stipulation

In order to protect important seasonal wild horse habitat, exploration, drilling, and other development will be allowed only during the period from July 1 to March 1. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer.

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

12. Deer and Elk Winter Range Stipulation

In order to protect important seasonal wildlife habitat, exploration, drilling, and other development will be allowed only during the period from May 1 to December 1. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer.

This stipulation may be waived or reduced in scope if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concern(s) identified.

13. Threatened and Endangered Plant Habitat Stipulations

The following portions of this lease are within the known habitat of the threatened, endangered, sensitive, and/or rare plant species (species name): (legal description).

Prior to any surface-disturbing activity, the lessee shall—

1. Engage the services of a qualified botanist, approved by the authorized officer, to conduct a thorough and complete intensive inventory of the areas to be disturbed for evidence of such species habitat.
2. Provide the authorized officer with sufficient time to review the documentary evidence that the inventory required above has been performed. This evidence shall be in the form of a report prepared on behalf of the lessee/operator, certified by the botanist, and submitted by the lessee to the authorized officer. The report shall cover, at a minimum, the location of the area inventoried, the inventory method, report of findings, and any conclusions/recommendations for mitigating measures to be followed to reduce the impact of surface disturbance on such plant species.
3. Follow any mitigating requirements set forth by the authorized officer concerning the protection or preservation of any such plant species. Such requirements may include the relocation of proposed roads, drilling site, or other facilities.

14. Threatened and Endangered Animal Habitat Stipulation

The following portions of this lease are within the known habitat of the threatened, endangered, sensitive, and/or rare animal species (species name): (legal description).

Prior to any surface-disturbing activity, the lessee shall—

1. Engage the services of a qualified biologist, approved by the authorized officer, to conduct a thorough and complete intensive inventory of the areas to be disturbed for evidence of such species habitat.
2. Provide the authorized officer with sufficient time to review the documentary evidence that the inventory required above has been performed. This evidence shall be in the form of a report prepared on behalf of the lessee/operator, certified by the biologist, and submitted by the lessee to the authorized officer. The report shall cover, at a minimum, the location of the area inventoried, the inventory method, report of findings, and any conclusions/recommendations for mitigating measures to be followed to reduce the impact of surface disturbance on such animal species.
3. Follow any mitigating requirements set forth by the authorized officer concerning the protection

Oil and Gas

or preservation of any such species. Such requirements may include the relocation of proposed roads, drilling site, or other facilities.

15. Threatened and Endangered Seasonal Habitat Stipulation

In order to protect important seasonal habitat of the threatened or endangered animal species (species name), any lease operations which may affect these species will be allowed only during the period from to (varies by species) on the following portions of this lease (legal description).. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer.

SECTION 3, OIL AND GAS LEASES WITHIN WILDERNESS STUDY AREAS

Major parts of Demaree Canyon and Little Book Cliffs Wilderness Study Areas (WSAs) contain oil and gas leases issued prior to enactment of the *Federal Land Policy and Management Act (FLPMA)* (19,300 of Demaree Canyon's 21,050 acres and 22,645 of Little Book Cliff's 26,525 acres). The presence of these pre-FLPMA leases creates the possibility that all or a major part of each WSA could not be managed as wilderness and would have to be removed from wilderness consideration.

The conflict between wilderness management and pre-FLPMA leases arises out of the terms of FLPMA. Section 603(c) requires the Secretary of the Interior to manage lands having wilderness characteristics (WSAs) so as not to impair their suitability for preservation as wilderness. At the same time, however, the Act excepts from this non-impairment standard rights that existed on the date of enactment (October 21, 1976), including mining, grazing, and mineral lease rights (BLM's "Interim Management Policy and Guidelines for Lands under Wilderness Review" gives a complete description of the legislative directives guiding the management of WSAs, including a full explanation of nonimpairment criteria). Among the rights inherent in a mineral lease is the right to develop the lease, subject to the terms and conditions of individual leases. Thus, if the rights conveyed by a pre-FLPMA lease can be exercised only through activities that would impair wilderness suitability, those activities must still be allowed, but may be regulated to prevent unnecessary or undue degradation. It should be emphasized that the exception for lease develop-

ment activities which would impair wilderness suitability applies only to pre-FLPMA leases. Leases issued after FLPMA's enactment (post-FLPMA leases) are constrained by the nonimpairment criteria.

To satisfy the requirements of the nonimpairment standard, the RMP/EIS team fully evaluated the rights conveyed by the subject pre-FLPMA leases and the possibility of avoiding impairment of wilderness characteristics. The evaluation focused on three considerations: (1) the terms and conditions of the subject leases, (2) the possibility of changing well site locations, and (3) the possibility of suspending leases within the WSAs and seeking legislation to cancel the leases. While these considerations are important to the management of both WSAs, it is of immediate consequence for the Little Book Cliffs WSA where eight outstanding applications for permit to drill (APDs) are awaiting decision. (A ninth outstanding APD for a site just outside the WSA but in the wild horse range and a tenth just outside both the Little Book Cliffs WSA and the Little Book Cliffs Wild Horse Range are also pending.) Following is a summary discussion of the team's evaluation, including the implications for the ten currently outstanding APDs and any legislation to cancel the leases.

Pre-FLPMA Lease Terms and Conditions

The valid existing rights represented by a lease include all the lease's terms and any stipulations attached to it. If the leases contained any terms specifically barring surface activity or disturbance, BLM could preserve the wilderness characteristics by denying APDs on the basis of restrictive terms in the lease. The Office of the Solicitor, Department of the Interior, examined all the pre-FLPMA leases affecting the two WSAs, including those on which the eight APDs are based, and determined that none of the leases contained terms which would warrant denial of all drilling activity.

Change of Well Site Location

The Secretary of the Interior has the authority, expressed in the standard oil and gas lease terms, to request a change of proposed well site location if the proponent's drilling objectives could be achieved at a less sensitive location. Thus, if another well site located within the lease but outside the WSA would accomplish the same exploration or production goals, the possibility arises that the non-

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impairment standard could be maintained by relocating the well site. This authority would be of limited utility since it would not apply when the lease in question is fully or predominantly within the WSA. Moreover, exercise of this authority could amount to little more than a delaying tactic since the logical pace and progression of lease development could eventually require location of surface facilities within the WSA. (Even after a Congressional designation as wilderness, pre-FLPMA leases would still carry development rights, unless specifically removed by Congress.) Perhaps most importantly, change of well site location could so increase drilling costs that the lessee's economic return would be unreasonably reduced. Such a result would constitute an excessive interference with the right to develop a lease.

The proposed well sites in the pending APDs, the companies' drilling objectives, and alternative sites were all evaluated by resource area staff. Section 4 of this appendix contains the evaluation for each APD. It was found that one of the proposed sites was in fact just outside the WSA boundary. Two other proposed sites (wells 1-15-99 and 2-14-99) perhaps could be moved outside the WSA but are on roads that would be constructed for access to other proposed sites further into the WSA. Thus it was determined unreasonable to relocate those two well sites outside the WSA (see Section 4 of this appendix). Two other sites (1-17-99 and 1-23-99) are near the WSA boundary, but relocation of the sites outside of the WSA would require unreasonable drilling costs (Appendix E, Section 3, Change of Well Site Location).

The remaining four proposed sites (wells 2-17-99, 2-16-99, 1-21-99, and 1-22-99) were so situated that directional drilling techniques would be required. Comparisons of vertical drilling and directional drilling at lateral distances up to 4,000 feet from a proposed site were evaluated using cost, risk and production data representative of conditions in the area where the proposed wells are located. (Note: Evaluations were done at lateral distances from 0 to 2,000 feet, at 3,500 feet, and at 4,000 feet, which is considered the technical limit of lateral displacement for wells at the depth anticipated by the APDs, 6,000 to 7,000 feet.) Under all gas price assumptions, from the \$3.00/MCF representing current conditions to the \$7/MCF needed to bring about new production, substantial reductions in the present worth of the project were brought about due to the additional costs required for directional drilling. At lower prices (\$3 and \$5/MCF) directional drilling beyond 2,000 feet produced negative present worth, with reductions in value from 55 to 1,000 percent. Even under the more optimistic \$7/MCF price assumption, present worth was reduced by 25 percent for wells moved

less than 2,000 feet and by 63 percent for wells moved up to 3,500 feet. In light of these cost comparisons, any relocation of the proposed well sites that would require directional drilling would make the proposals uneconomic or would reduce profitability by an unreasonable amount.

Suspension of the Leases Pending Cancellation

The Secretary of the Interior has authority to temporarily suspend operations under the leases and at the same time submit a legislative proposal for termination of the leases with appropriate compensation to the leaseholders. However, after careful consideration, the District Manager has judged the suspension of the subject leases to be an inappropriate and unwarranted application of suspension authority. While precedent for such an action exists, the authority to suspend leases and then to pursue legislation to cancel the leases has been used sparingly and only in instances where extremely high resource values were at stake; e.g., the recreational, aesthetic, and ecological value of the miles of California coastline endangered by the blow out and oil spill in the Santa Barbara Channel.

Congress produced both the legislative requirement that BLM manage WSAs "in a manner so as not to impair the suitability of such areas for preservation as wilderness" and the exceptions to this nonimpairment requirement which include the rights inherent in mineral leases issued prior to date of the enactment of FLPMA. We can only assume that Congress anticipated that conflicts would arise and that the resolution of these conflicts would at times mean the sacrifice of wilderness characteristics. Nowhere is there an expression of Congressional intent that exceptions to the nonimpairment standard were to be overridden by extraordinary measures such as lease suspension and corrective legislation.

The question of compensation to leaseholders was reviewed, but it was decided that any evaluation of the cost of buying out the leases would be too speculative to be of much use. A meaningful evaluation would be difficult because little information exists on the geologic resource at stake, the market conditions that might be operative, or the structure of a buy-out. For example, the compensation could be in the form of cash or of an exchange, the entire lease could be cancelled, or only a portion of the lease could be cancelled. It is possible only to assert that the buy-out of up to 40,000 acres under lease in the two WSAs would be very costly and would require an act of Congress.

SECTION 4, PENDING APPLICATIONS FOR PERMIT TO DRILL

Introduction and Background

Ten pending applications for permit to drill (APDs) are currently on file in the Grand Junction Resource Area Office. Eight of the pending APDs are located in the Little Book Cliffs Wilderness Study Area (WSA), one is located in the Little Book Cliffs Wild Horse Range and one is outside of both areas (Fig. 3-3, Chap. 3). The ten APDs have been included in this resource management plan and environmental impact statement (RMP/EIS) in order to properly analyze the site-specific and cumulative impacts of lease development in the Little Book Cliffs WSA and Wild Horse Range. Cumulative impacts from approval of the ten pending APDs and further development of the Little Book Cliffs WSA leases are contained in Chapter 4, Environmental Consequences. In addition, a zone approach has been developed to describe impacts from lease development on wilderness values within the Dismaree Canyon and Little Book Cliffs WSAs (Chap. 4, Continuation of Current Management Alternative, Impacts on Wilderness). The site-specific analysis for approval of each APD and the recommended conditions of approval are described in this section. A description of typical oil and gas well projects is included in section 1 of this appendix.

Except as noted below, the proposed wells would not cause impacts to threatened or endangered plant or animal species, critical floodplains, wetlands, prime and unique farmlands, areas of critical environmental concern, or wild and scenic rivers, visual resources, and water quality. No impacts would occur to air quality, locatable minerals, mineral materials, paleontological resources, forestry, livestock grazing, cultural and historic resources, natural areas, transportation, public utilities, social or economic values in the area, or fire management.

Site-Specific Analysis

Koch Exploration Co. No. 2-14-99, Sec. 14, T. 9 S., R. 99 W.

This well would require construction of a 225-foot by 300-foot drill pad within the Little Book Cliffs WSA. No additional road construction would be necessary as the well site is located on the proposed access road to well 1-22-99. This new sur-

face disturbance would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) provide a 10-foot strip of undisturbed vegetation along the adjacent drainage, (3) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production, (4) rotate the pad so that the long axis runs from northwest to southeast, and (5) remove and properly dispose of drilling fluids and mud.

A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chapter 4, Continuation of Current Management, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurred.

Construction of the project could impact wildlife and livestock. Fencing the reserve pit would help to prevent entrapment. A residual impact would be the lost forage from the road and pad areas until vegetation is reestablished.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chapter 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance would be eliminated. The residual impact

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on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 1.6 acres.

An area within approximately 500 feet of the proposed well site was examined for alternate well sites. An alternative site outside the WSA was found approximately 500 feet to the southeast of the proposed site. This site was not considered further as it would have resulted in greater environmental impact than the proposed site. Additional impacts at the alternative site include higher soil erosion and a greater reduction of visual quality due to crossing of the main drainage, slightly greater cut and fill, and longer access road.

The additional loss of wilderness value (1.6 acres) which would be associated with the proposed well site was not considered to be significant as the proposed site is located adjacent to the access road to proposed well No. 1-22-99.

Koch Exploration Co. No. 1-15-99, Sec. 15, T. 9 S., R. 99 W.

This well would require construction of a 225-foot by 350-foot drill pad within the Little Book Cliffs WSA. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production, (3) install culverts where required and riprap fill slopes, (4) rotate the location 180 degrees from the originally proposed orientation and staircase the reserve pit, and (5) remove and properly dispose of drilling fluids and mud. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chapter 4, Continuation of Current Management, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurred.

Construction of the project could impact wildlife and livestock. Fencing the reserve pit would help to

prevent entrapment. A residual impact would be the lost forage from the road and pad areas until vegetation is reestablished.

A cultural resource inventory located a cultural site in the vicinity of the proposed well pad. The site is outside the actual area of disturbance. In order to avoid disturbance of the site, an archaeologist must monitor construction activities.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chapter 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance would be eliminated. The residual impact on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 1.8 acres.

An area within approximately 500 feet of the proposed well site was examined for alternative well sites. No area was found which would be more environmentally acceptable than the proposed site.

Koch Exploration Co. No. 2-16-99, Sec. 16, T. 9 S., R. 99 W.

This well would require construction of 0.5 mile of new access road, upgrading of 0.5 mile of jeep trail, and construction of a 225-foot by 350-foot drill pad within the Little Book Cliffs WSA. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) remove and properly dispose of drilling fluids and mud, and (3) reseed disturbed areas with adapted species when the areas

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are no longer needed for drilling or production. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chapter 4, Continuation of Current Management, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurred.

Construction of the project could impact wildlife and livestock. Fencing the reserve pit would help to prevent entrapment. A residual impact would be the lost forage from the road and pad areas until vegetation is reestablished.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chapter 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance should be eliminated. The residual impact on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 5.7 acres.

An alternate drill site located outside the WSA in the SW $\frac{1}{4}$, Sec. 9, T. 9 S., R. 99 W., 6th P.M. was considered. Impacts to resources, other than wilderness and oil and gas, would be approximately the same at the alternate site as at the proposed site. There would be no impacts to wilderness values. However, since it would be necessary to directionally drill the well and directional drilling of this magnitude would unreasonably reduce profitability of the project (Appendix E, Section 3, change of well site location), the alternate site was not considered further.

Koch Exploration Co. No. 1-17-99, Sec. 17, T. 9 S., R. 99 W.

This well would require construction of 0.06 mile of new access road and a 215-foot by 300-foot drill pad within the Little Book Cliffs WSA. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. In addition, fill along the north edge of the pad could allow runoff onto the existing road which runs parallel to the proposed drill pad location. The reserve pit would also receive runoff from the slope above the pad. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) provide a 15-foot strip of undisturbed vegetation on the north side of the pad, (3) cut a one-foot deep diversion ditch above the pit to divert runoff, (4) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production, and (5) remove and properly dispose of drilling fluids and mud. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chap. 4, Continuation of Current Management, Impacts on Coal Resources).

The well site is located in deer critical winter range and is within a livestock grazing allotment. Fencing the reserve pit would help to prevent entrapment. The impact on deer could be partially mitigated by not allowing construction or drilling activity during the winter months. Residual impacts on deer and livestock include the loss of forage from the disturbed area until revegetation is accomplished and disruption due to human presence.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be partially mitigated by requiring the operator to recontour all disturbed sites to match the original contour as soon as an area is no longer needed and to paint all facilities dark green to blend with the vegetation. Residual impacts to visual resources would include changes to visual quality due to disruption of the natural landscape.

This well site is within Zone 2 of the Little Book Cliffs WSA (Chap. 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and well pad would have a significant impact on wilderness characteristics and could constrain Congress from designating

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this portion of the WSA as wilderness. Construction activity would be monitored by BLM to ensure that no unnecessary disturbance occurs; but the residual impact on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 1.7 acres and the progressive loss of wilderness characteristics within this zone. However, a manageable portion of the WSA would still be available for Congressional consideration.

Alternate drill sites outside the WSA were considered. However, no alternate site was found which would allow the operator to meet his goals without directional drilling. As directional drilling of this magnitude would unreasonably reduce profitability of the project (Appendix E, Section 3, Change of Well Site Location), alternate sites were not considered further. No site was found which was more environmentally acceptable than the proposed site.

Koch Exploration Co. No. 2-17-99, Sec. 17, T. 9 S., R. 99 W.

This well would require construction of a 225-foot by 350-foot drill pad within the Little Book Cliffs WSA. This new surface disturbance would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) remove and properly dispose of drilling fluids and mud, and (3) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chap. 4, Continuation of Current Management Alternative, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator, and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurs.

The well site is located in deer critical winter range and a livestock grazing allotment. The impact on deer and livestock could be partially mitigated by not allowing construction or drilling activity during the winter months. Fencing the reserve pit would help to prevent entrapment. A residual

impact would be the lost forage from the road and pad areas until vegetation is reestablished and disruption of wildlife and livestock due to human presence.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be partially mitigated by requiring the operator to recontour all disturbed sites to match the original contour as soon as an area is no longer needed and to paint all facilities dark green to blend with the vegetation. Residual impacts to visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chapter 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance would be eliminated. The residual impact on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 1.6 acres.

An alternate drill site located outside the WSA in the SW $\frac{1}{4}$, Sec. 9, T. 9 S., R. 99 W., 6th P.M. was considered. Impacts to resources, other than wilderness and oil and gas, would be approximately the same at the alternate site as at the proposed site. There would be no impacts to wilderness values. However, since it would be necessary to directionally drill the well and directional drilling of this magnitude would unreasonably reduce profitability of the project (Appendix E, Section 3, Change of Well Site Location), the alternate site was not considered further. Since this proposed well is located along the access road to proposed well No. 2-16-99, the additional disturbance that would be associated with this well was not considered to be a significant addition. No other site was found to be more environmentally acceptable than the proposed site.

Koch Exploration Co. No. 1-21-99, Sec. 21, T. 9 S., R. 99 W.

This well would require construction of 1.0 mile of new access road, upgrading of 0.5 mile of jeep trail, and a 225-foot by 350-foot drill pad within the Little Book Cliffs WSA. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction,

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vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) remove and properly dispose of drilling fluids and mud, (3) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production, and (4) install culverts where required and riprap fill slopes. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chapter 4, Continuation of Current Management Alternative, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurred.

Construction of the project could impact wildlife and livestock. Fencing the reserve pit would help to prevent entrapment. A residual impact would be the lost forage from the road and pad areas until vegetation is reestablished.

A cultural resource inventory located a cultural site in the vicinity of the proposed access road. The site is outside the actual area of disturbance. In order to avoid disturbance of the site, an archaeologist must monitor construction activities.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chapter 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance would be eliminated. The residual impact

on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 7.6 acres.

An alternate drill site located outside the WSA in the SW¼, Sec. 15, T. 9 S., R. 99 W., 6th P.M. was considered. There would be approximately 5.8 acres less disturbance at this site, as no road construction would be necessary. There would be no impacts to wilderness values, and impacts to other sources, except for oil and gas, would be approximately the same at the alternate site as at the proposed site. However, since it would be necessary to directionally drill the well and directional drilling of this magnitude would unreasonably reduce profitability of the project (Appendix E, Section 3, change of well site location), the alternate site was not considered further.

Koch Exploration Co. No. 1-22-99, Sec. 22, T. 9 S., R. 99 W.

This well would require construction of 0.8 mile of new access road, upgrading of 0.8 mile of jeep trail, and a 225-foot by 350-foot drill pad within the Little Book Cliffs WSA. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. The reserve pit would also receive runoff from the slope above the pad. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) remove and properly dispose of drilling fluids and mud, (3) cut a one-foot deep diversion ditch above the pit to divert runoff, (4) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production, (5) install culverts where required and riprap fill slopes, and (6) the reserve pit will be triangular in shape to fit the existing topography. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chapter 4, Continuation of Current Management, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurred.

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Construction of the project could impact wildlife and livestock. Fencing the reserve pit would help to prevent entrapment. A residual impact would be the lost forage from the road and pad areas until vegetation is reestablished.

A cultural resource inventory of the road and well site located 2 cultural sites. Both sites are outside the actual area of disturbance. In order to avoid disturbance of these sites, an archaeologist must monitor construction activities.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chapter 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance would be eliminated. The residual impact on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 5.9 acres.

An alternate drill site located outside the WSA in the SE $\frac{1}{4}$, Sec. 15, T. 9 S., R. 99 W., 6th P.M. was considered. There would be approximately 5.8 acres less disturbance at this site, as no road construction would be necessary. There would be no impacts to wilderness values, and impacts to other sources, except for oil and gas, would be approximately the same at the alternate site as at the proposed site. However, since it would be necessary to directionally drill the well and directional drilling of this magnitude would unreasonably reduce profitability of the project (Appendix E, Section 3, Change of Well Site Location), the alternate site was not considered further.

Coors Energy Co. No. 1-3 WMR, Sec. 3, T. 10 S., R. 99 W.

This well would require construction of 1.1 mile of new access road and a 265-foot by 375-foot drill pad. At the time of the onsite (June 14, 1982) this proposed well site was thought to be inside the

boundary of the Little Book Cliffs WSA. However, the proposed well and access road are not within the WSA, and would not impact wilderness values. A portion of the access road is within the Little Book Cliffs Wild Horse Range. A BLM right-of-way will be required as the access road crosses off-lease lands.

Surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) construct the reserve pit below the pad so that at least 50 percent of the pit volume is in cut, (3) scatter dead vegetative material and brush from the access road, (4) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production. Reserve pit contents would be handled under standard procedures. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chap. 4, Continuation of Current Management, Impacts on Coal Resources).

The well site is also located in critical deer winter range. The impact on deer could be partially mitigated by not allowing construction or drilling activity during the winter months. Impacts to deer could be mitigated by requiring fencing of the reserve pit to prevent entrapment. To prevent escape of wild horses additional cattleguards and gates at the entrance to the horse range could be required. Residual impacts to deer and wild horses include the loss of forage from vegetation removal until revegetation is accomplished, and disruption due to human presence.

No site was found which was more environmentally acceptable than the proposed site.

Koch Exploration Co. No. 1-23-99, Sec. 17, T. 99 S., R. 99 W.

This well would require upgrading of 0.8 mile of jeep trail, and construction of a 225-foot by 350-foot drill pad within the Little Book Cliffs WSA. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these

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activities would also cause a short-term reduction in productive capability. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) move the center stake 50 feet east to reduce cut and fill, (3) round the northwest corner of the pad so that fill will not enter the adjacent drainage, (4) reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production, and (5) remove and properly dispose of drilling fluids and mud. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chap. 4, Continuation of Current Management, Impacts on Coal Resources).

This well would require removal of trees. In order to conserve this resource, all salable wood would be purchased by the operator and residues would be properly disposed of. A residual impact on forest management would be the loss of trees until regrowth occurred.

The reserve pit could impact wildlife and livestock. Fencing the reserve pit would help to prevent entrapment. A residual impact would be the lost forage from the road and pad areas until vegetation is accomplished.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

This well is within Zone 1 of the Little Book Cliffs WSA (Chap. 4, Continuation of Current Management Alternative, Impacts on Wilderness). Construction of the access road and drill site would impair wilderness characteristics in the area of the development and would eliminate the area of development from wilderness consideration. This would not constrain Congress from designating the remaining portions of the WSA as wilderness as a manageable unit would still exist. By monitoring construction and drilling activities, unnecessary disturbance would be eliminated. The residual impact on wilderness, even after successful reclamation, would be the loss of wilderness characteristics on 1.6 acres.

Alternate drill sites outside the WSA were considered. However, no alternate site was found which

would allow the operator to meet his goals without directional drilling. As directional drilling of this magnitude would unreasonably reduce profitability of the project (Appendix E, Section 3, Change of Well Site Location), alternate sites were not considered further. No site was found which was more environmentally acceptable than the proposed site.

Koch Exploration Co. No. 2-14-100, Section 14, T. 9 S., R. 100 W.

This well would require construction of 0.4 mile of new access road, upgrading of 1.0 mile of jeep trail, and a 225-foot by 350-foot drill pad. The proposed well site is located within the Little Book Cliffs Wild Horse Range. These new surface disturbances would cause an increase in soil erosion, potentially increasing sediment yield from affected areas by 0.1 to 1.5 tons per acre per year. Soil compaction, vegetation loss, and reduced moisture retention resulting from these activities would also cause a short-term reduction in productive capability. The reserve pit would also receive runoff from the slope above the pad. These impacts could be mitigated by requiring the operator to (1) stockpile topsoil for use in reclamation, (2) rotate the location so it is parallel with the contour and move the center stake 10 feet to the south, (3) no fill will be placed in the drainage north of the location, (4) culverts will be installed where required and fill slopes will be riprapped, (5) access road will be located above the spillway of the dam in SW¼, Sec. 14, T. 9 S., R. 100 W.; the spillway will be left at least 6 feet wide, and (6) cut a one-foot deep diversion ditch above the pit to divert runoff, and reseed disturbed areas with adapted species when the areas are no longer needed for drilling or production. Reserve pit contents would be handled under standard procedures. A residual impact to soils and water resources would be the short-term increase (three to five years) in erosion and sediment yield prior to revegetation.

If approved and drilled, this well could result in the loss of about 86,000 tons of coal in a protective pillar around the well (Chapter 4, Continuation of Current Management, Impacts on Coal Resources).

This well site is located in critical winter range for deer and is within the Little Book Cliffs Wild Horse Range. Fencing the reserve pit will help to prevent entrapment. The impact on deer and wild horses would be partially mitigated by not allowing construction or drilling activity during the winter months and closing any new roads to public use. Installation of cattleguards and gates would help to prevent escape of the wild horses. Residual impacts would be the lost vegetation from the road and pad

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areas until the vegetation is reestablished, and an increase in human harassment.

Construction of the access road and well site would reduce the visual quality of the area. This impact could be mitigated by requiring the operator to recontour all disturbed areas to match the original contour as soon as an area is no longer needed and to paint all production facilities dark green to blend with the vegetation. Residual impacts on visual resources would include changes to visual quality due to disruption of the natural landscape.

An area within approximately 500 feet of the proposed well site was examined for alternate well sites. No area was found which would result in less environmental impact than the proposed site.

Conditions of Approval

Table E-1 illustrates the recommended conditions of approval as they apply to each particular APD. These conditions of approval were developed during site-specific onsite examinations.

Table E-1. Recommended Conditions of Approval for Pending Applications for Permit to Drill

Recommended Conditions of Approval	Applicable Well Number
Contact the Grand Junction Resource Area Manager at least one week prior to commencing construction of the access road and well pad. BLM personnel must be present at start of construction.	All
The operator will immediately bring to the attention of the Grand Junction Resource Area Manager any and all antiquities or other objects of historic or scientific interest including, but not limited to, historic or prehistoric ruins, artifacts, or fossils, discovered as a result of operations under this permit. The operator will immediately suspend all activities in the area of the object and leave such discoveries intact until told to proceed by the Area Manager. Notice to proceed will be based upon evaluation of the cultural significance of the object. Evaluation will be by a qualified professional selected by the Area Manager from a Federal Agency insofar as practical. When not practical, the operator will follow the mitigation requirements set forth by the Area Manager concerning protection, preservation, or disposition of any sites or material discovered. In those situations where the Area Manager determines that data recovery and/or salvage excavations are necessary, the operator will bear the cost of such data recovery and/or salvage operations.	All
Construction and drilling activity will not be allowed between December 1 and May 1 because of mule deer migration area, unless, otherwise approved by the Grand Junction Resource Area Manager.	2-17-99, 2-16-99, 1-3WMR, 1-17-99
Construction and drilling activity will not be allowed between December 1 and July 1 because of critical deer winter range and wild horse foaling unless otherwise approved by the Grand Junction Resource Area Manager.	2-14-100, 1-3WMR
The operator shall take the necessary preventative measures to assure no wild horses escape from the wild horse area. Should any horses get out due to the negligence of the operator, the expense of their roundup shall be met by Koch. If any mishaps involving wild horses occur, the BLM Grand Junction Resource Area Manager shall be notified immediately. Gates at entrance and exit of the horse range shall be kept closed during the activity.	2-14-100
The location and proposed access road will be cleared prior to any construction. All trees will be disposed of by the operator. Stumps will be buried in an area designated by the BLM or burned in the reserve pit prior to placement of drilling facilities. If the material is burned, the operator must obtain a state burning permit and notify the appropriate county health department 24 hours in advance of burning. BLM has the right to restrict burning during periods of high fire danger. Any stump left in place will be cut so that the stump height does not exceed 12 inches. All slash less than four inches in diameter will be chipped or scattered outside the cleared area and must be within 24 inches of the ground at all points. All material four inches in diameter and greater will be removed from Federal land, unless otherwise directed. A wood permit from BLM for _____ cords of juniper and _____ cords of pinyon will be required prior to any clearing.	All except, 1-3WMR
Topsoil will be stripped to a depth of 6 to 8 inches and stockpiled on the edge of the location. No topsoil stripping will be attempted when soils are moisture saturated to a depth of 3' or more, or frozen deeper than the stripping depth. A BLM right-of-way grant is required for the off lease/unit portion of the access road. The grant must be obtained prior to any construction on the location or proposed access road.	All
The existing and proposed access roads will be crowned, ditched, or dipped from V-2 County Road to the location prior to use for moving the drill rig onto the site. The maximum disturbed width will not exceed 32 feet with an 18-foot running surface. All vehicular travel will be confined to the running surface. Dust will be controlled by the use of water or an approved dust retardant, as directed by the Grand Junction Resource Area Manager. Culverts will be installed at the locations shown on the attached maps. Fill below the culverts will be ripped to prevent erosion.	All except 1-3WMR
	1-15-99, 1-21-99, 1-22-99, 2-14-99, 2-14-100

Oil and Gas

Table E-1. Recommended Conditions of Approval for Pending Applications for Permit to Drill—Continued

Recommended Conditions of Approval	Applicable Well Number
The reserve pit will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. Fencing will be 4 strands of barbed wire or 48-inch woven wire with one strand of barbed wire above the woven wire. All corners will be braced with a wooden H-type brace. The fence construction will be on cut or undisturbed surface.	1-12-99, 1-15-99, 1-21-99, 1-22-99, 2-14-99
The reserve pit will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. The fence shall be of game-proof construction, and will be 84 inches high. The bottom 48 inches will be woven wire, and the top 36 inches will be smooth wire. All corners will be braced with a wooden H type brace. The fence construction will be on cut or undisturbed surface.	2-14-100
The reserve pit will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished. The fence shall be of game-proof construction, and will be 84 inches high. The bottom 48 inches will be woven wire, and the top 36 inches will be barbed wire. All corners will be braced with a H-type brace. The fence construction will be on cut or undisturbed surface.	1-3WMR, 1-17-99, 2-16-99, 2-17-99
Reserve pit fluids and/or mud will be removed and taken to an approved disposal facility within 60 days after a well is drilled. Pits will be filled and recontoured within 90 days after a well is drilled.	All except 1-3WMR and 2-14-100
The Grand Junction Resource Area Manager will be notified at least 24 hours prior to commencing reclamation work. All disturbed areas will be seeded with a seed mixed specified by the authorized officer. Prepare seedbed by contour cultivating four to six inches deep. Drill seed 1/4 to 1/2 inch deep following the contour. In areas that cannot be drilled, broadcast seed at double the application rate and cover 1/4 to 1/2 inch deep with a harrow, drag bar, or chain. Seeding must be completed after August 15, and prior to October 1.	All
All permanent equipment and buildings will be painted dark green to blend with the vegetation.	All
If the well is a producer: Upgrade and maintain access roads as necessary to prevent soil erosion, and accommodate year round traffic. Reshape areas unnecessary to operations, distribute topsoil, rip or disk, and seed all disturbed areas outside the work area according to the above seed mixture. Perennial vegetation must be established. Additional work will be required in case of seeding failures. All permanent facilities placed on the location will be painted dark green to blend with the natural environment.	All
If the well is abandoned/dry hole: Restore the access road and location to match the original contours. During the reclamation of the site, push the fill material into cuts and up over the backslope. Leave no depressions that will trap water or form ponds. Distribute top soil evenly over the location, and seed according to the above seed mixture. The access road and location will be ripped or disked prior to seeding. Perennial vegetation must be established. Additional work will be required in case of seeding failures.	All except 1-3WMR and 2-14-100
Restore the access road and location to blend with the original contours. During the reclamation of the site, push the fill material into cuts and up over the backslope. Leave no depressions that will trap water or form ponds. Distribute top soil evenly over the location, and seed according to the above seed mixture. The access road and location will be ripped or disked prior to seeding. Perennial vegetation must be established. Additional work will be required in case of seeding failures.	1-3WMR and 2-14-100
No abandonment marker will be installed.	All except 1-3WMR and 2-14-100
The abandonment marker will be 4 inch diameter pipe, 3 feet long with not more than 1 foot above ground and embedded in concrete. The pipe will be capped with a steel plate which has the well identity and location permanently inscribed.	1-3WMR, 2-14-100
The area is considered to be satisfactorily reclaimed when (1) all soil erosion associated with the operation has been stabilized, and (2) an acceptable vegetative cover has been established. An acceptable vegetative cover will consist of a percent vegetative cover at least equal to that present prior to disturbance, and a plant species composition at least as desirable as that present prior to disturbance. Additional work will be required until these conditions are satisfied.	All
During air drilling the blooey line must be directed into a pit and misted to prevent dust emissions.	All
The dead vegetation material that remains from the old chaining, live brush and trees will be scattered outside of the road construction area.	1-3WMR
The reserve pit will be stepped down and constructed in cut material.	1-3WMR
Trash will be confined in a covered container and hauled to an approved landfill.	All
No bore holes will be used for disposal of waste materials. Human waste will be contained and will be disposed of at an approved sanitary landfill.	All

Appendix E

Table E-1. Recommended Conditions of Approval for Pending Applications for Permit to Drill—Continued

Recommended Conditions of Approval	Applicable Well Number
The cattleguards at the entrance and exits of the wild horse range shall be extended. The existing guards are 12 feet in length, 10 feet in width, H-20 structures, and the name brand is Powder River. An adjacent guard shall be installed to the same specifications. Metal gates shall be installed across the guards. We recommend using two 12-foot gates. Gate catch posts shall be installed along the roadway to tie the gates open. The guards and gates shall be installed prior to drilling activity. The adjacent gates shall be reinstalled. The minimum width shall be 18 feet.	1-3WMR
The center stake on the location will be moved 50 feet east of the original stake.	1-12-99
The northwest corner will be rounded so that fill does not enter the drainage below.	1-12-99
The location will be rotated 180 degrees, and the reserve pit will be stair-stepped below the rig.	1-15-99
The site border of 5ME3938, is flagged and must not be impacted by construction activity. All construction in the vicinity of the Site 5ME3938 will be monitored by a qualified archaeologist.	1-15-99
A one-foot deep diversion ditch will be cut above the cut along the southern edge of the pad, and drain to the east.	1-17-99, 1-22-99
The pad will be extended 25 feet on the north side and shortened 25 feet on the west side. A 15-foot strip of undisturbed vegetation will remain between the toe of the fill and the road on the northern side of the pad.	1-17-99
Construction of the access road will require an approved archaeological monitor for site 5ME2928.	1-21-99
The location will be moved 100 feet on the bearing of 110 degrees to reduce cuts and fills.	1-22-99
Archaeological site 5ME4105 will be located and flagged prior to start of construction to prevent accident impact.	1-22-99
A drainage diversion ditch will be constructed above the reserve pit to prevent runoff from entering the reserve pit or location.	1-22-99, 2-14-100
The location will be rotated so that the pad orientation will be approximately 50 degrees west of north.	2-14-99
A 10-foot undisturbed buffer zone will be maintained between the toe of the fill and the drainage system.	2-14-99
The reserve pit will be triangular with the apex of the pit at the 200-foot southwest reference stake and the legs extending to the south and west corners.	2-14-99
The east corner of the pad will be rounded to leave a 10-foot buffer from the toe of the fill to the main drainage.	2-14-99
The location will be rotated parallel with the contour and the center stake will be moved 10 feet to the south.	2-14-100
No fill will be placed in the drainage north of the location.	2-14-100
Road construction will be above the spillway for the existing dam and fill will leave not less than 6 feet of width for the spillway.	2-14-100

APPENDIX F

PRIORITIES FOR HABITAT MANAGEMENT PLANS

Priorities for managing major wildlife habitat would differ among all alternatives. Therefore, the area selected for the habitat management plans would differ. The priorities reflect the needs of meeting

wildlife management goals in relation to the overall objectives of an alternative. Tables F-1 through F-4 show priorities by alternative.

Table F-1. Habitat Management Plan Schedule, Continuation of Current Management Alternative

HMP Name	Pri- ority	Ap- proval Date	Area (P.L. Acres)	HMP Key Species
Roan Creek.....	1	1978	260,000	Mule deer
Unaweep Seep.....	2	1983	55	Great Basin silverspot
Kannah Creek.....	3		46,500	Deer, elk, pronghorn
Collbran.....	4		96,500	Deer, elk
Unaweep, The Palisade, Dugway.....	5		30,000	Elk, deer
Colorado River.....	6		24,275	Bald eagle, endemic fish
Grand Valley Desert.....	7		148,960	Pronghorn, waterfowl, desert wildlife
Book Cliffs to Roan Cliffs.....	8		259,846	Deer, elk, bear
Dominguez.....	9		91,340	Elk, deer
Glade Park.....	10		202,587	Elk, deer
Calamity Mesa.....	11		65,000	Deer
Dolores West and Ute Creek.....	12		55,000	Peregrine falcon, turkey
Total.....			1,280,060	

Table F-2. Habitat Management Plan Schedule, Commodity Alternative

HMP Name	Pri- ority	Ap- proval Date	Acres	Key Species Emphasis
Roan Creek.....	1	1978	260,000	Deer
Unaweep Seep.....	2	1983	55	Great Basin silverspot butterfly
Kannah Creek.....	3	1985	62,000	Elk, deer, pronghorn, waterfowl
Skipper's Island.....	4		160	Riparian, wildlife habitat
Book to Roan Cliffs.....	5		273,830	Deer, elk, bear
Collbran.....	6		81,000	Elk, deer
Aquatic-Riparian.....	7		*(3,000)	Trout, riparian wildlife habitat
Grand Valley.....	8		147,100	Pronghorn, waterfowl, desert game
Ute to Mesa Creek.....	9		68,337	Deer, elk
Unaweep to Dugway.....	10		30,000	Deer, elk
Dolores River West.....	11		51,663	Deer, elk
Dominguez.....	12		91,340	Deer, elk
Glade Park.....	13		214,575	Deer, elk, wild turkey, grouse
Total.....			1,280,060	

*Not included in sum because these acres are dispersed throughout the other source areas—100 percent overlap.

Table F-3. Habitat Management Plan Schedule, Protection Alternative

HMP Name	Pri- ority	Ap- proval Date	Acres	Key Species Emphasis
Roan Creek.....	1	1978	259,530	Deer
Unaweep Seep.....	2	1983	55	Great Basin silverspot butterfly
Kannah Creek.....	3	1985	62,000	Elk, deer, pronghorn, waterfowl
Pyramid Rock.....	4		470	Uinta Basin hookless cactus, a Phacelia

Appendix F

Table F-3. Habitat Management Plan Schedule, Protection Alternative—Continued

HMP Name	Pri- ority	Ap- proval Date	Acres	Key Species Emphasis
Skipper's Island.....	5		160	Bald eagle, riparian wildlife
Rough Canyon.....	6		1,470	Spineless hedgehog cactus, unique canyon life
Badger Wash Uplands	7		1,230	<i>Cryptantha elata</i> , a desert plant community
Collbran.....	8		81,000	Elk, deer
Colorado River	9		12,136	Bald eagle, endemic fishes, riparian wildlife
Aquatic-Riparian	10		^a (3,000)	Riparian wildlife, Colorado River cutthroat trout
Grand Valley	11		145,870	Unique desert life including pronghorn and water- fowl
Wilderness	12		^b 204,544	Pristine wildlife conditions
Book to Roan Cliffs	13		249,330	Deer, elk, bear
Bang's-Dominguez.....	14		103,906	Unique mesa and canyon life
Glade Park.....	15		74,654	Grouse, wild turkey
Unaweep to Dugway.....	16		11,500	Deer, elk, bear
Ute to Mesa Creek	17		68,337	Deer, elk
Dolores River West.....	18		32,523	Peregrine falcon, ponderosa pine zone wildlife
Total.....			1,280,060	

^aNot included in sum because these acres are dispersed throughout the other source areas—100 percent overlap.

^bThere are 49,010 acres in addition in Montrose and Moab Districts.

Table F-4. Habitat Management Plan Schedule, Preferred Alternative

HMP Name	Pri- ority	Ap- proval Date	Acres	Key Species Emphasis
Roan Creek.....	1	1978	259,475	Deer
Unaweep Seep.....	2	1983	55	Great Basin silverspot butterfly
Kannah Creek.....	3	1985	62,000	Elk, deer, pronghorn, waterfowl
Book to Roan Cliffs	4		273,830	Deer, elk, bear
Collbran.....	5		81,000	Elk, deer
Grand Valley.....	6		147,100	Pronghorn, waterfowl, desert game
Colorado River	7		12,136	Bald eagle, other threatened and endangered spe- cies
Bang's-Dominguez.....	8		133,035	Deer, elk
Ute to Mesa Creek	9		68,337	Deer, elk
Aquatic-Riparian.....	10		^a (3,000)	Trout, riparian wildlife habitat
Unaweep to Dugway.....	11		30,000	Deer, elk
Glade Park.....	12		77,554	Deer, elk, wild turkey, grouse
Dolores West.....	13		32,828	Deer, elk
Pyramid Rock	14		470	Uinta Basin hookless cactus
Wilderness	15		^b 102,240	Pristine wildlife conditions
Total.....			1,280,060	

^aAcres not included in total—100 percent overlap with all others except Pyramid Rock

^bMoab and Montrose Districts (47,200 acres) are not included in this total.

APPENDIX G

LIVESTOCK GRAZING SUMMARY UPDATE

Table G-1 is an update of The Summary of Intensive and Less Intensive AMPs as listed in the *Grand Junction Grazing Environmental Statement*. Following is an explanation of what is in each column.

- (1) Management category. This shows the general management objective for each allotment: I=improve existing resource conditions, most intensive management; M=maintain existing resource condition, less intensive management; and C=custodial management, least intensive management.
 - (2) The grazing system designed for the allotment. RR=rest rotation grazing; DEF=deferred grazing; BP=best pasture grazing.
 - (3) Implementation status. IMP=Allotment Management Plan (AMP) fully implemented; Part=AMP partially implemented; NOT=AMP not implemented. (BLM has initiated the following integrated rangeland studies on all implemented and partially implemented allotments: Wildlife—pellet group transects, browse utilization, browse form and class, riparian and aquatic; Watershed—sediment yield and precipitation; Range—actual use, utilization and range trend.)
 - (4) Public acres. The acres of public land in the allotment.
 - (5) Authorized use. The upper limit animal in unit months of livestock use that can be made on public land in an allotment. The number of livestock multiplied by the period of use (in months) cannot exceed the authorized use.
 - (6) Numbers of livestock. The average number of livestock that could be on the allotment.
 - (7) Kind of livestock authorized to graze that allotment. C=cattle; S=sheep; H=horses.
 - (8) Percent public land. The percentage of total forage in the allotment produced on public land (AUMs).
 - (9) Period of use. The average time when livestock are present on the allotment.
- Please note: (1) the Cameo Allotment No. 6708 and Gipp Allotment No. 6822 no longer have authorized grazing use and are not listed on the table, (2) Powell Allotment No. 6717 has been transferred to the White River Resource Area for grazing administration, and (3) changes in the public AUMs and allotments from that published in the grazing ES are explained in the footnotes.

Table G-1. Livestock Grazing Summary Update

Number	Allotment Name	Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
							No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6101	Fish Park ¹	I.....	RR	IMP	3863	570	250	C.....	100	10/15-11/14
	.....						320	C.....	100	05/01-05/31
6102	Brush Hole.....	C.....			33	28	140	C.....	010	10/01-11/30
6103	Haystack.....	M.....	DEF	IMP	1352	153	64	C.....	040	05/15-11/15
6105	South of the Road ²	M.....	DEF	IMP	1350	57	28	C.....	075	12/11-12/30
	.....						42	C.....	075	04/05-05/15
6106	East Tom's Canyon Common.....	I.....	DEF	IMP	3788	205	100	C.....	100	10/09-10/17
	.....						142	C.....	100	05/01-05/31
	.....						25	C.....	100	11/01-12/10
6108	Longshore Above Rims	M.....	DEF	NOT	664	80	32	C.....	100	07/16-09/30
6109	Longshore Below Rims.....	M.....	DEF	NOT	1212	142	417	C.....	019	06/01-07/15
6110	Sieber Canyon	C.....			1400	48	12	C.....	100	11/01-02/28
6111	McKenzie.....	M.....	DEF	NOT	409	52	22	C.....	077	06/01-07/15
	.....						131	C.....	077	10/01-10/08
6112	Dierich Ranch	C.....			1355	54	777	S.....	023	05/20-06/10
	.....									10/17-11/08
6113	Fessler ³	M.....	DEF	IMP	900	63	890	S.....	082	05/28-06/09
6115	Spring Creek	I.....	DEF	NOT	5547	381	121	C.....	067	05/20-10/10

Appendix G

Table G-1. Livestock Grazing Summary Update—Continued

Allotment		Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
Number	Name						No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6116	Bangs.....	I.....	RR.....	NOT.....	23623	1563	234	C.....	100	11/10-05/29
6117	Files.....	M.....	DEF.....	NOT.....	2814	127	103	C.....	029	11/14-01/16
							237	C.....	029	05/15-06/11
6118	King-Rogers.....	C.....			1224	121	27	C.....	100	06/17-10/31
6119	Dead Horse.....	I.....	RR.....	NOT.....	1087	22	22	C.....	100	01/01-01/30
6120	Landini.....	I.....	RR.....	NOT.....	2430	161	160	C.....	094	02/01-02/28
6121	Notch Spring.....	I.....	RR.....	NOT.....	3037	271	225	C.....	023	06/15-08/09
							335	C.....	023	05/09-06/15
							464	C.....	023	11/01-11/09
6122	Clarks Bench.....	I.....	RR.....	NOT.....	2663	106	100	C.....	086	05/09-06/15
6123	Upper Bench.....	I.....	DEF.....	NOT.....	5478	328	70	C.....	100	04/10-05/20
							127	C.....	100	01/01-02/25
6124	Woods.....	C.....			448	120	147	C.....	020	07/01-10/20
							900	S.....	020	07/10-07/19
6125	Lower Bench.....	I.....	DEF.....	Part.....	16022	1400	302	C.....	100	12/01-02/28
							902	S.....	100	12/24-02/28
							909	S.....	100	03/01-03/17
6126	28 Hole.....	I.....	DEF.....	NOT.....	1615	59	370	S.....	028	04/20-06/01
							926	S.....	028	03/18-03/26
							926	S.....	028	12/16-12/23
6127	Duval.....	M.....	DEF.....	NOT.....	728	57	37	C.....	100	05/15-06/30
6128	Skinner.....	M.....	DEF.....	NOT.....	1805	64	86	C.....	022	05/05-06/30
							900	S.....	022	05/15-06/05
6129	Snyder Flats ⁴	I.....	DEF.....	NOT.....	2983	415	302	C.....	038	05/12-06/15
							1450	S.....	038	05/12-06/21
							87	C.....	038	06/16-10/20
6130	Colorado Ridge.....	I.....	DEF.....	NOT.....	11853	659	140	C.....	094	12/15-05/15
6131	Leslie-Bays.....	C.....			1505	78	20	C.....	100	01/01-01/31
										06/01-06/15
							38	C.....	100	12/01-12/15
							50	S.....	100	01/05-02/28
6132	Payne Wash.....	C.....			2323	26	100	C.....	050	06/16-06/20
							108	C.....	050	11/16-11/25
6133	Reservation.....	I.....	DEF.....	NOT.....	2744	122	40	C.....	089	04/10-05/09
							60	C.....	089	12/18-01/25
							500	S.....	089	12/01-12/17
6134	Little Dolores River.....	C.....			1675	85	12	C.....	100	06/01-10/31
							100	S.....	100	11/01-11/15
							107	S.....	100	05/20-06/10
6135	Little Dolores Bench.....	I.....	DEF.....	NOT.....	775	97	60	C.....	039	04/10-05/09
							61	C.....	039	12/01-01/31
							500	S.....	039	02/01-02/20
6136	Knowles.....	I.....	DEF.....	NOT.....	5260	234	50	C.....	100	04/01-05/31
							67	C.....	100	01/01-02/28
6137	Timber Ridge.....	I.....	DEF.....	NOT.....	2120	221	52	C.....	100	06/01-06/30
							83	C.....	100	10/01-11/15
							750	S.....	100	11/07-11/15
6138	Black Ridge.....	I.....	DEF.....	NOT.....	4615	459	113	C.....	072	12/16-06/04
6139	Flat Rock.....	C.....			653	114	21	C.....	100	07/01-10/31
							750	S.....	100	11/01-11/06
6140	Moore.....	C.....			366	48	4	C.....	100	03/01-02/28
6141	Burke.....	I.....	RR.....	NOT.....	2157	100	100	C.....	100	05/15-07/14
										10/15-12/14
6142	Colorado River ⁵	I.....	RR.....	NOT.....	8018	232	368	C.....	061	05/15-07/14
										10/15-12/14
6143	Radio Tower.....	I.....	RR.....	NOT.....	905	119	88	C.....	029	11/15-12/15
							205	C.....	029	05/24-07/10
6145	Palisade Point.....	M.....	DEF.....	IMP.....	1244	91	182	C.....	100	05/21-06/04
6146	North Fork.....	C.....			1166	60	17	C.....	100	06/15-09/28
6147	Holloway.....	C.....			413	14	8	C.....	050	04/01-05/15
							53	S.....	050	04/01-05/15
6148	Thompson.....	M.....	DEF.....	NOT.....	4781	54	36	C.....	030	05/01-10/01

Livestock Summary Update

Table G-1. Livestock Grazing Summary Update—Continued

Allotment		Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
Number	Name						No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6150	Metz	M.....	RR	IMP	2190	80	54	C.....	074	08/01-09/30
6151	Pineridge	C.....	.....	.....	1285	120	40	C.....	030	10/16-10/31
	.....						62	C.....	030	05/25-10/15
6152	Round Knob ^a	M.....	DEF	IMP	3687	342	89	C.....	100	05/01-05/31
	.....						253	C.....	100	01/01-01/31
6153	Burford Individual	C.....	.....	.....	629	42	500	C.....	010	06/20-07/14
6154	Lost Canyon ⁷	I.....	DEF	Part.....	32481	2791	438	C.....	091	03/01-05/30
	.....									11/01-02/28
6155	Little Dolores Canyon.....	C.....	.....	.....	1533	96	8	C.....	100	03/01-02/28
6156	North East Creek.....	M.....	DEF	NOT	3553	81	40	C.....	100	05/01-06/16
	.....									10/01-10/15
6157	Boulder Canyon	I.....	DEF	IMP	2888	132	37	C.....	088	12/01-12/31
	.....						75	C.....	088	05/16-06/15
6158	Ladder Canyon	I.....	DEF	IMP	2425	142	110	C.....	051	06/16-07/15
	.....									10/01-11/15
6159	Cook Canyon	C.....	.....	.....	195	18	3	C.....	100	05/01-10/31
6160	Mabie	C.....	.....	.....	66	10	2	C.....	100	06/01-10/31
6161	Coates Creek ^a	C.....	.....	.....	295	26	26	C.....	100	04/23-05/22
6162	Hall	C.....	.....	.....	72	5	8	C.....	062	06/01-06/30
6163	West Tom's Canyon.....	I.....	DEF	IMP	3232	110	25	C.....	100	12/01-12/31
	.....						85	C.....	100	04/20-05/19
6164	Fish Canyon	I.....	DEF	Part.....	3933	180	75	C.....	100	12/06-12/29
	.....						120	C.....	100	04/20-05/19
6165	Beezer ⁷	I.....	RR	IMP	1130	251	160	C.....	100	04/12-05/13
	.....						160	C.....	100	11/16-11/30
6166	Hill Creek-Flats	I.....	DEF	Part.....	5069	710	332	C.....	088	11/01-11/15
	.....						506	C.....	088	06/03-07/10
6167	Battleship	C.....	.....	.....	1807	78	3	C.....	100	03/01-02/28
	.....						50	S.....	100	11/15-12/25
	.....						105	S.....	100	05/01-06/10
6168	Rattlesnake	C.....	.....	.....	735	21	7	C.....	050	03/01-04/30
	.....									11/01-02/28
6201	Davis AMP	I.....	RR	IMP	5160	427	110	C.....	100	11/21-01/20
	.....						140	C.....	100	04/15-05/31
6202	Kannah Creek Common ⁷	I.....	RR	Part.....	29710	3698	821	C.....	100	05/01-06/30
	.....						821	C.....	100	10/01-11/30
	.....						200	C.....	100	12/01-01/31
6203	Whitewater Common.....	M.....	DEF	NOT	22300	2422	670	C.....	089	04/15-06/15
	.....						670	C.....	089	10/11-12/31
6204	Highway 50.....	C.....	.....	.....	920	77	54	C.....	100	05/20-05/25
	.....						81	C.....	100	11/21-12/07
	.....						100	C.....	100	11/15-11/20
6205	Whitewater Hill.....	C.....	.....	.....	1300	118	42	C.....	100	05/08-05/27
	.....						50	C.....	100	10/28-12/21
6206	Bean.....	C.....	.....	.....	500	45	15	C.....	100	12/01-02/28
6207	Kannah Creek Individual.....	C.....	.....	.....	1150	105	47	C.....	100	04/01-04/31
	.....						117	C.....	100	11/15-12/31
6301	Gibbler Common.....	I.....	RR	Part.....	45012	3315	845	C.....	100	05/01-06/16
	.....						1108	C.....	100	10/01-12/31
	.....						176	C.....	100	12/28-02/27
6302	Wagon Park Common.....	I.....	RR	NOT	31385	1164	515	C.....	100	10/16-11/15
	.....						649	C.....	100	05/01-05/31
6303	Triangle Mesa	C.....	.....	.....	3612	96	45	C.....	100	11/15-01/19
6304	Woodring	I.....	DEF	IMP	1167	75	64	C.....	050	04/26-05/31
	.....						72	C.....	050	10/15-11/115
6401	Palisade Flats.....	I.....	RR	IMP	8780	400	126	C.....	100	12/01-12/31
	.....						153	C.....	100	04/01-05/25
6402	Bull Draw Common	M.....	DEF	IMP	5084	182	45	C.....	100	04/27-05/26
	.....						91	C.....	100	10/16-11/31
6403	Dugway ^a	I.....	DEF	IMP	7254	296	1005	S.....	100	04/15-05/20
6404	Beaver Mesa	I.....	DEF	IMP	889	86	40	C.....	100	11/02-12/01
	.....						86	C.....	100	11/14-12/13

Appendix G

Table G-1. Livestock Grazing Summary Update—Continued

Number	Allotment	Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
	Name						No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6405	Wright Draw.....	M.....	DEF.....	IMP.....	3525	138	40	C.....	100	04/24-05/24
							39	C.....	100	10/16-12/31
6406	Blue Mesa ⁹	I.....	DEF.....	Not.....	42410	2176	311	C.....	100	11/01-05/31
6407	Bull Hill-Maverick Common ⁸	I.....	DEF.....	NOT.....	14354	563	129	C.....	100	04/16-05/31
							196	C.....	100	10/16-11/30
6408	Casto-Lines Common ¹⁰	I.....	DEF.....	IMP.....	1565	133	52	C.....	100	04/16-05/24
							65	C.....	100	11/01-12/31
6409	Sinbad Valley ⁸	I.....	DEF.....	Not.....	10155	550	80	C.....	100	10/20-05/15
6410	Ute Creek Comm.....	M.....	DEF.....	IMP.....	6908	260	35	C.....	100	10/15-05/27
6411	Dolores River ⁸	M.....	DEF.....	IMP.....	1751	158	57	C.....	071	11/16-01/25
							68	C.....	071	04/16-05/25
6413	Ames.....	C.....			281	21	10	C.....	100	12/01-01/31
6415	Tom Casto.....	C.....			65	6	3	C.....	100	03/01-04/30
6416	North Creek.....	I.....	DEF.....	IMP.....	4155	55	70	C.....	025	04/01-05/15
							77	C.....	025	12/01-01/15
6417	Unaweep N. Side.....	C.....			2880	193	250	C.....	011	03/01-05/31
										11/01-02/28
6418	Unaweep S. Side.....	C.....			1247	117	150	C.....	015	10/16-12/31
							200	C.....	015	04/01-05/31
6419	Hubbard.....	I.....	DEF.....	IMP.....	27411	831	86	C.....	090	04/01-05/31
							88	C.....	090	11/16-01/15
							139	C.....	082	04/01-05/31
							225	C.....	005	06/01-11/15
6420	GML ¹¹	M.....	DEF.....	IMP.....	2980	132	66	C.....	100	03/01-03/31
							66	C.....	100	12/01-12/31
6421	Mule Trail Draw.....	C.....			81	8	30	C.....	025	12/11-01/10
6422	J.L.....	C.....			151	37	24	C.....	034	03/01-05/15
										12/31-02/28
6423	EHL and West Creek.....	C.....			382	2	1	C.....	100	02/01-02/28
										03/01-03/31
6424	Berg's North Mesa.....	M.....	DEF.....	Not.....	1783	143	50	C.....	064	05/17-09/30
6425	South Unaweep ¹²	C.....			40	5	3	C.....	014	03/01-02/28
6426	North Unaweep ¹²	C.....			760	35	26	C.....	078	04/10-05/09
							19	C.....	078	11/01-11/30
6427	Turner Gulch.....	C.....			1363	60	37	C.....	030	04/15-06/05
							48	C.....	030	10/05-12/31
6428	Nelson.....	M.....			2461	175	150	C.....	050	05/01-05/28
										11/15-12/26
6429	Dolores Point ⁷	I.....	DEF.....	IMP.....	7954	1001	350	C.....	100	05/01-06/20
							170	C.....	100	10/17-12/31
6430	Salt Wash.....	C.....			1298	55	10	C.....	100	03/01-05/15
										12/01-02/28
6431	Cottonwood.....	C.....			1308	222	12	C.....	100	12/01-12/20
							46	C.....	100	03/01-05/10
6432	Beeman.....	C.....			783	33	13	C.....	100	04/16-05/31
										10/16-11/15
6433	Hamilton.....	M.....	DEF.....	Not.....	520	49	49	C.....	050	12/01-01/31
6434	Gateway ⁷	I.....	DEF.....	IMP.....	1197	90	20	C.....	100	03/01-03/31
							70	C.....	100	02/01-02/28
6501	Big Salt.....	I.....	RR.....		25888	1299	200	C.....	087	03/01-05/31
							200	C.....	087	10/17-02/28
6502	Coal Gulch-Roan Creek.....	I.....	RR.....	Not.....	24875	1876	411	C.....	100	05/11-06/14
							441	C.....	100	09/28-11/07
							460	C.....	100	06/15-10/14
6503	Garr Mesa ¹¹	M.....	DEF.....	IMP.....	6079	685	154	C.....	061	03/01-05/20
6504	Hunter Wash ⁷	I.....	RR.....	Not.....	16032	1411	1492	S.....	095	03/01-04/30
							2221	S.....	095	01/01-02/29
6505	Buniger.....	I.....	DEF.....	IMP.....	1388	60	10	C.....	100	05/01-10/31
6506	Lapham-Post ⁸	I.....	DEF.....	IMP.....	6074	544	180	C.....	088	05/16-10/20
6507	Little Salt.....	I.....	RR.....	Not.....	32985	2734	479	C.....	095	03/01-05/31
							499	C.....	095	12/01-02/28
6508	Mogensen.....	C.....			1537	67	67	C.....	100	12/01-12/31

Livestock Summary Update

Table G-1. Livestock Grazing Summary Update—Continued

Allotment		Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
Number	Name						No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6509	Mount Garfield	I	RR	IMP	27249	1900	237	C	100	11/01-02/28
							238	C	100	03/01-06/30
6601	Badger Wash	I	RR	IMP	8059	857	1247	S	100	11/18-02/28
6602	East Salt	M	RR .....	.....	94278	9930	10	H	100	06/01-02/28
							820	C	100	03/01-02/28
6603	West Salt Common ⁷	I	DEF	IMP	70271	8516	800	C	079	04/15-02/28
							18	H	079	05/01-11/30
6604	Crow Bottom ¹¹	I	DEF	IMP	3936	244	61	C	100	01/01-02/28
6606	Corral Canyon-Mountain ⁶	M	DEF	IMP	9795	708	302	C	044	05/21-10/31
6607	Sphinx-Mitchell ⁶	M	DEF	IMP	4604	556	150	C	089	05/01-05/31
							295	C	089	10/01-12/22
6608	Dry Canyon-Demaree ⁶	M	DEF	IMP	9690	571	154	C	080	12/23-02/28
6609	Spann	C .....	.....	.....	26	8	1	C	100	03/01-10/31
6610	Maluy	M	RR	IMP	2064	168	140	C	100	04/12-05/17
6612	Baker-Bitter Creek	M	DEF	Not	15594	1026	2655	S	080	03/01-05/06
							2655	S	080	11/27-02/28
6613	Rabbit Valley ⁹	M	BP	IMP	15848	1377	900	S	100	03/01-05/20
							1422	S	100	11/15-02/28
							1517	S	100	11/15-02/28
6614	Carbonera Rims ¹³	C .....	.....	.....	3266	93	1395	S	100	04/10-04/19
6616	Prairie Canyon	I	DEF	Not	25645	668	89	C	095	05/01-12/27
6701	Bear Gulch	C .....	.....	.....	1013	58	27	C	062	05/25-07/20
							37	C	062	10/16-11/20
6702	Berry Homestead	M	DEF	Part	2935	218	134	C	053	05/01-05/31
							181	C	053	11/15-12/31
6703	Brink Pedigo Gulch	I	DEF	Not	4937	111	134	C	100	10/16-10/24
							161	C	044	05/01-05/31
6704	Corcoran Wash	I	RR	IMP	9776	1296	400	C	081	05/01-06/15
							400	C	081	10/16-12/31
6705	Brush Mountain Common	I	DEF	Not	2278	867	353	C	100	07/01-10/15
6706	Burdick E. of Ranch	I	DEF	IMP	1287	90	60	C	100	04/16-05/31
							90	C	100	11/01-11/30
6707	Burdick Homestead	C .....	.....	.....	115	21	5	C	100	06/27-11/01
6709	Carr Creek	C .....	.....	.....	710	153	164	C	062	10/01-11/15
6710	Conn Creek	C .....	.....	.....	1100	96	96	C	100	04/01-04/30
6711	Conn Mountain Common	C .....	.....	.....	168	90	18	C	100	06/01-10/31
6712	Coon Hollow Common ¹¹	I	DEF	IMP	18561	1218	394	C	084	10/25-12/19
										04/15-05/31
6713	Winter Flats-Deer Park	M	BP	IMP	27055	2505	20	C	100	03/01-05/31
							100	Y	100	04/10-05/31
							650	C	100	11/16-02/28
6714	Dougherty Gulch	I	DEF	Not	3117	140	31	C	100	06/01-10/15
6715	Dry Fork	M	DEF	Not	10497	564	100	C	038	03/01-04/15
							200	C	038	04/16-06/15
							124	C	038	06/16-09/30
6716	East End Cow Mountain	I	DEF	Not	583	106	53	C	100	06/01-07/30
6718	East Spear Common	I	DEF	Not	13601	844	429	C	100	04/16-05/31
							200	C	100	11/01-11/30
6719	Eby Point ¹	C .....	.....	.....	602	63	16	C	100	06/16-10/14
6720	Etcheverry	C .....	.....	.....	550	94	750	S	020	02/01-02/28
										03/01-04/30
6721	Head of Carr Creek	I	DEF	Not	5804	250	55	C	100	06/16-11/01
6722	Carbon	M	DEF	Not	2155	413	82	C	100	05/31-10/31
6723	Henderson Ridge Common	I	DEF	Not	982	303	76	C	100	06/16-10/30
6724	Kimball Creek	M	RR	Not	12283	194	48	C	100	03/01-05/30
							50	C	100	11/01-11/30
6725	4-A Mountain	M	DEF	Not	854	316	4	H	050	06/16-10/15
							150	C	050	06/16-10/15
6726	Horse Mountain	I	DEF	Not	678	100	25	C	100	06/16-10/15
6727	I.A.E. of Ranch	I	DEF	Not	1934	147	64	C	071	05/01-05/30
							96	C	071	11/01-12/15
6728	Kimball Foothill Common	C .....	.....	.....	462	49	92	C	100	05/16-05/31

Appendix G

Table G-1. Livestock Grazing Summary Update—Continued

Allotment		Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
Number	Name						No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6729	Kimball Mountain.....	M.....	DEF.....	Not.....	837	200	40	C.....	100	06/01-10/31
6732	Logan End Common ¹⁴	C.....	DEF.....	Not.....	1841	365	73	C.....	100	06/01-10/31
6733	Logan Gulch.....	M.....	DEF.....	IMP.....	3927	508	346	C.....	100	05/05-06/18
6734	Logan Wash Common.....	I.....	DEF.....	Not.....	1524	21	22	C.....	050	04/05-05/31
6735	Lower Brush Mountain.....	C.....	.....	.....	497	128	32	C.....	100	06/16-10/15
6736	Lower Carr Creek Common ..	C.....	.....	.....	329	30	65	C.....	100	11/01-11/30
6737	Lower Roan Creek Common.	I.....	DEF.....	Not.....	5012	206	138	C.....	100	05/16-06/15
	.....	.....	.....	.....	.....	.....	194	C.....	100	10/16-10/22
6738	Lower 4-A.....	I.....	DEF.....	Not.....	2258	633	114	C.....	100	06/26-11/02
	.....	.....	.....	.....	.....	.....	150	C.....	100	05/26-06/25
6739	McCurdy Wash.....	I.....	DEF.....	Not.....	804	40	10	C.....	100	04/01-04/30
	.....	.....	.....	.....	.....	.....	40	C.....	100	04/01-04/30
6740	Homestead ¹	M.....	DEF.....	Not.....	4410	210	75	C.....	070	05/07-06/24
	.....	.....	.....	.....	.....	.....	135	C.....	070	05/15-06/24
6741	Middle Cow Ridge.....	I.....	DEF.....	Not.....	1088	285	130	C.....	073	06/16-09/15
6742	Paddock.....	M.....	DEF.....	Part.....	1710	245	100	C.....	057	05/01-11/15
6743	Parkes Place.....	C.....	.....	.....	120	16	10	C.....	100	05/16-06/15
	.....	.....	.....	.....	.....	.....	11	C.....	100	10/16-10/31
6744	Roan Creek.....	I.....	RR.....	Not.....	9261	448	206	C.....	100	06/15-11/10
6745	Round Mountain ¹⁵	I.....	RR.....	Part.....	17626	1148	226	C.....	100	04/25-06/25
	.....	.....	.....	.....	.....	.....	344	C.....	100	10/01-11/30
6746	Stoner.....	I.....	DEF.....	Not.....	622	35	130	C.....	015	06/01-06/24
	.....	.....	.....	.....	.....	.....	10	C.....	015	06/25-09/30
	.....	.....	.....	.....	.....	.....	60	C.....	015	10/01-11/15
6747	Tater Hills.....	I.....	DEF.....	IMP.....	1709	177	177	C.....	100	05/10-06/09
6748	Upper Brush Mountain.....	M.....	DEF.....	Not.....	950	306	7	H.....	038	06/10-10/10
	.....	.....	.....	.....	.....	.....	190	C.....	038	06/10-10/10
6749	Walker.....	I.....	DEF.....	Not.....	5730	169	87	C.....	033	06/16-10/15
	.....	.....	.....	.....	.....	.....	165	C.....	033	10/16-11/15
6750	Webber.....	C.....	.....	.....	190	32	50	C.....	025	05/01-05/31
	.....	.....	.....	.....	.....	.....	.....	.....	.....	10/01-11/15
6751	West Cow Mountain.....	I.....	DEF.....	Not.....	1197	401	149	C.....	084	06/25-09/30
6752	West Logan Wash.....	I.....	DEF.....	Not.....	230	28	14	C.....	100	04/01-05/31
6753	West Spears.....	I.....	DEF.....	Not.....	6551	470	100	C.....	100	11/01-12/15
	.....	.....	.....	.....	.....	.....	223	C.....	100	05/01-06/13
6754	Whittaker Flats ¹	M.....	DEF.....	IMP.....	3270	292	18	C.....	100	11/15-01/30
	.....	.....	.....	.....	.....	.....	723	S.....	100	01/01-02/21
6755	4-A Place.....	C.....	DEF.....	IMP.....	310	34	34	C.....	100	05/25-06/24
6801	Sunnyside Common ¹⁶	I.....	RR.....	IMP.....	7403	1077	354	C.....	092	04/16-06/25
	.....	.....	.....	.....	.....	.....	180	C.....	092	10/18-12/31
	.....	.....	.....	.....	.....	.....	946	S.....	092	12/22-01/27
6802	Bald Hill Common ¹	I.....	.....	Not.....	800	234	246	C.....	100	06/10-06/30
	.....	.....	.....	.....	.....	.....	930	S.....	100	10/17-10/26
6803	Grassy Gulch Common ¹	M.....	.....	Not.....	445	93	118	C.....	100	06/01-06/15
6805	Hawxhurst Common ¹	M.....	.....	Not.....	4180	274	280	C.....	100	05/20-07/04
6806	Salt Creek Common.....	C.....	.....	.....	2596	78	107	C.....	070	05/15-06/15
6807	Spring Creek to Coon Creek Common.	I.....	DEF.....	IMP.....	4730	513	181	C.....	100	05/16-06/30
	.....	.....	.....	.....	.....	.....	185	C.....	100	10/01-10/08
6808	White Mountain Common.....	I.....	DEF.....	IMP.....	2932	401	40	C.....	100	04/16-06/15
	.....	.....	.....	.....	.....	.....	163	C.....	100	05/02-06/30
6809	Wild Country Common.....	I.....	DEF.....	Part.....	7974	746	477	C.....	073	04/15-06/26
6810	Plateau Creek ¹⁷	C.....	.....	.....	85	14	4	C.....	100	06/01-09/15
6811	Lyons ¹¹	I.....	DEF.....	IMP.....	896	202	815	S.....	077	12/05-01/19
	.....	.....	.....	.....	.....	.....	851	S.....	077	12/01-01/23
6812	Anderson Ind. ¹¹	I.....	DEF.....	IMP.....	1430	149	835	S.....	100	01/20-02/19
	.....	.....	.....	.....	.....	.....	870	S.....	100	12/23-01/23
6813	Red Mountain.....	C.....	.....	.....	464	12	100	S.....	030	05/01-06/30
6814	Guthrie Place.....	C.....	.....	.....	160	18	12	C.....	075	06/01-07/31
6815	Webb Isolated Tracts.....	C.....	.....	.....	200	17	3	C.....	100	04/16-09/30
6816	Bevan.....	C.....	.....	.....	120	18	6	C.....	100	06/15-09/15

Livestock Summary Update

Table G-1. Livestock Grazing Summary Update—Continued

Number	Allotment Name	Management Category	Grazing System	Implementation Status	Public Acres	Authorized Use (AUMs)	Livestock		Percent public land	Period of Use
							No.	Kind		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6817	Clifton.....	C.....	.....	.....	660	26	65	S.....	100	01/01-01/31
	.....	.....	.....	.....	.....	.....	.....	.....	.....	04/16-05/15
6818	Davis.....	C.....	.....	.....	500	35	27	C.....	042	05/01-05/31
	.....	.....	.....	.....	.....	.....	29	C.....	042	11/01-12/30
6819	Ervin.....	C.....	.....	.....	30	10	1	H.....	020	05/01-10/31
	.....	.....	.....	.....	.....	.....	9	C.....	020	05/01-10/31
6820	Gaptor.....	C.....	.....	.....	560	84	40	C.....	070	05/01-06/15
	.....	.....	.....	.....	.....	.....	.....	.....	.....	10/16-11/30
6821	Fetters.....	C.....	.....	.....	40	12	2	C.....	100	05/01-10/30
6823	Halfway House ¹⁸	M.....	DEF.....	IMP.....	768	52	72	C.....	072	05/01-05/31
6824	Collier Creek.....	C.....	.....	.....	80	26	47	C.....	100	06/08-06/15
	.....	.....	.....	.....	.....	.....	.....	.....	.....	10/10-10/17
6825	Hawkins.....	C.....	.....	.....	40	30	30	C.....	100	04/16-05/15
6826	Hawkins.....	C.....	.....	.....	160	46	57	C.....	033	07/07-09/19
6827	Clover Gulch.....	C.....	.....	.....	730	35	17	C.....	100	04/16-06/16
6828	Hight.....	C.....	.....	.....	730	4	2	C.....	100	06/01-07/31
6829	Hunter.....	C.....	.....	.....	200	35	10	C.....	100	06/01-09/15
6830	Horizon.....	C.....	.....	.....	80	14	30	C.....	010	05/16-09/30
6832	Leon ¹⁹	C.....	.....	.....	280	85	21	C.....	100	06/15-10/15
6833	Kinney ¹	C.....	.....	.....	1430	80	52	C.....	100	06/01-06/30
	.....	.....	.....	.....	.....	.....	.....	.....	.....	10/01-10/16
6834	Dry Kimball ¹	C.....	.....	.....	820	11	56	C.....	028	05/26-06/15
6835	Lloyd ¹	C.....	.....	.....	2140	111	21	C.....	100	05/22-10/31
6836	Long.....	C.....	.....	.....	280	45	150	C.....	020	05/16-06/30
6837	Heely.....	C.....	.....	.....	1870	134	127	C.....	077	04/20-05/31
6838	Lorimor.....	C.....	.....	.....	200	20	10	C.....	064	06/01-09/01
6839	Collier.....	C.....	.....	.....	240	97	24	C.....	100	06/16-07/05
6840	Milholland.....	C.....	.....	.....	280	27	90	C.....	020	05/01-06/15
6841	Hittle Place.....	C.....	.....	.....	440	75	15	C.....	100	05/16-10/15
6842	Nichols.....	C.....	.....	.....	598	11	42	C.....	017	05/01-06/15
	.....	.....	.....	.....	.....	.....	.....	.....	.....	06/16-06/26
6843	Big Park.....	M.....	DEF.....	NOT.....	11610	759	120	C.....	050	04/01-04/14
	.....	.....	.....	.....	.....	.....	540	C.....	050	04/15-04/30
	.....	.....	.....	.....	.....	.....	782	C.....	050	05/01-06/15
6844	Lower Rapid-Cottonwood ¹	M.....	DEF.....	IMP.....	3517	168	40	C.....	100	10/01-11/15
	.....	.....	.....	.....	.....	.....	108	C.....	100	04/15-05/14
6845	Chalk Mountain.....	M.....	.....	.....	1493	70	13	C.....	100	05/20-10/31
6846	Robbins.....	C.....	.....	.....	720	113	113	C.....	100	05/01-05/30
6847	Jerry Gulch.....	I.....	DEF.....	IMP.....	1771	158	810	S.....	075	04/22-05/30
6848	Berthod Place.....	C.....	.....	.....	160	19	24	C.....	034	07/10-09/18
6849	McCurry.....	C.....	.....	.....	80	16	28	C.....	010	05/16-06/15
	.....	.....	.....	.....	.....	.....	50	C.....	010	06/16-08/31
6850	Brown Place.....	C.....	.....	.....	636	8	8	C.....	100	03/28-04/27
6851	Baldrige Mesa.....	C.....	.....	.....	1493	16	9	C.....	100	04/10-05/31
6853	Molina Place.....	C.....	.....	.....	130	30	15	C.....	100	04/01-05/31
6854	East of Collbran.....	C.....	.....	.....	1080	84	12	C.....	100	05/01-11/30
6855	Charlesworth Isolated Tract.....	C.....	.....	.....	120	7	2	C.....	100	04/16-07/30
6856	Ella ²⁰	C.....	.....	.....	40	4	5	S.....	100	06/01-10/14
6857	Mormon Mesa ²⁰	C.....	.....	.....	200	29	24	C.....	100	06/01-06/14

¹The proposed livestock use listed in the grazing ES was in error.

²The authorized use was not reduced because of additional forage produced by brush treatment and reseeding on the allotment in 1981.

³The authorized use and the percent public land were changed based on a 1980 range survey of the public and private land.

⁴The authorized use was not reduced because errors were made in calculating the available AUMs in the grazing ES. When errors were corrected, no reduction was necessary.

⁵The authorized use was reduced because the Rattlesnake allotment (6168) was created from the Colorado River allotment after the final grazing ES, creating two allotment from one.

⁶A range survey was completed on the allotment in 1979 which showed the allotment produced adequate forage. Therefore, no reduction was made.

⁷Allotments on which the permittees are taking voluntary reductions in authorized use. Final decisions on determination of authorized use will be completed in 1985 following 5 years of monitoring.

Appendix G

⁸The authorized use was not reduced because a 1979 range survey showed no need for a reduction and the class of livestock was changed.

⁹The authorized use for this allotment was determined through a 1979 range survey.

¹⁰The stocking rate was determined through range studies completed on the allotment over the past three years.

¹¹The stocking rate was reduced based on the 1979 range survey and agreed to by the permittees.

¹²The authorized use was changed based on a 1979 range survey and grazing use agreement.

¹³Authorized use was reduced because part of the allotment was transferred to the West Salt (6603) allotment.

¹⁴The reduction listed in the grazing ES was too small to be significant and could not be reasonably supported by the accuracy limits of the range analysis.

¹⁵The stocking rate was not reduced due to constraining language in the cooperative agreement that created the Little Book Cliffs Wild Horse Range. Allotment has been in non-use most of the time, and we have not been able to conduct adequate studies.

¹⁶Livestock use in this allotment is based on utilization studies, and the livestock are removed each year when 50 percent utilization is reached.

¹⁷The allotment name was changed from Alexander to Plateau Creek due to a ranch transfer.

¹⁸A range survey in 1979 disclosed a need to change the percent public land.

¹⁹The allotment name was changed from Jones to Leon and combined with the Moss (6852) allotment.

²⁰Allotments were created from public land that was unallotted for grazing at the time of the grazing ES.

APPENDIX H

RECREATION OPPORTUNITY SPECTRUM (ROS) CLASSES

Table H-1 describes each of the six ROS classes in terms of (1) experience opportunities, (2) setting opportunities, and (3) activity opportunities. These descriptors provide a general overview of the opportunities included in each class. These overview statements do not describe each class in detail but rather provide a point of departure from which the

planner or manager can develop more precise prescriptions for each class based on specific situations encountered in field operations. The listing of activity opportunities is provided for illustrative purposes. It is not an all-inclusive list of activity opportunities on public land.

Table H-1. Recreation Opportunity Spectrum Class Descriptions

Opportunity Class	Experience Opportunity	Setting Opportunity	Activity Opportunity
Primitive	Opportunity for isolation from the sights and sounds of man, to feel a part of the natural environment, to have a high degree of challenge and risk, and to use outdoor skills.	Area is characterized by essentially unmodified natural environment of fairly large size. Concentration of users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of man-induced restrictions and controls. Only facilities essential for resource protection are used. No facilities for comfort or convenience of the user are provided. Spacing of groups is informal and dispersed to minimize contacts between groups. Motorized use within the area is not permitted.	Camping, hiking, climbing, enjoying scenery or natural features, nature study, photography, spelunking, hunting (big game, small game, upland birds, waterfowl) ski touring and snowshoeing, swimming, diving (skin and scuba), fishing, canoeing, sailing, and river running (non-motorized craft).
Semi-Primitive Non-motorized	Some opportunity for isolation from the sights and sounds of man, but not as important as for primitive opportunities. Opportunity to have high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills.	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, is often evidence of other area users is present. Onsite controls and restrictions may be present but are subtle. Facilities are provided only for the protection of resource values and the safety of users. Formal spacing of groups may be made to disperse use and limit contacts between groups. Motorized use is not permitted.	Camping, hiking, climbing, enjoying scenery or natural features, nature study, photography, spelunking, hunting (big game, small game, upland birds, waterfowl), ski touring and snowshoeing, swimming, diving (skin and scuba), fishing, canoeing, sailing, and river running (non-motorized craft).
Semi-Primitive Motorized	Some opportunity for isolation from the sights and sounds of man, but not as important as for primitive opportunities. Opportunity to have high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills. Explicit opportunity to use motorized equipment while in the area.	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but often there is evidence of other area users present. Onsite controls and restrictions may be present, but are subtle. Facilities are provided for the protection of resource values and safety of users only. Formal spacing of groups may be made to disperse use and limit contacts between groups. Motorized use is permitted.	Same as the above, plus the following: off-road vehicle use, four-wheel drive, dune buggy, dirt bike, snowmobile, power boating.

Appendix H

Table H-1. Recreation Opportunity Spectrum Class Descriptions—Continued

Opportunity Class	Experience Opportunity	Setting Opportunity	Activity Opportunity
Roaded Natural	About equal opportunities for affiliation with other user groups and for isolation from sights and sounds of man. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities are not very important except in specific challenging activities. Practice of outdoor skills may be important. Opportunities for both motorized and non-motorized recreation are present.	Area is characterized by a generally natural environment with moderate evidence of the sights and sounds of man. Resource modification and use practices are evident but harmonize with the natural environment. Concentration of users is low to moderate with facilities sometimes provided for group activity. Onsite controls and restrictions offer a sense of security. Rustic facilities are provided for user convenience as well as for safety and resource protection. Conventional motorized use is provided for in construction standards and design of facilities.	All activities listed previously plus the following: picnicking, rock collecting, wood gathering, auto touring, downhill skiing, snowplay, ice skating, water skiing and other water sports, hand gliding, interpretive use, rustic resorts and organized camps.
Semi-Urban (also called Rural)	Opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are generally more important than the natural setting. Opportunities for wildland challenges. Risk taking and testing of outdoor skills are unimportant, except in those activities involving challenge and risk.	Area is characterized by substantially modified natural environment. Resource modification and use practices are obvious. Signs and sounds of man are readily evident and the concentration of users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for specific activities. Developed sites, roads and trails are designed for moderate to high use. Moderate densities are provided far away from developed sites. Facilities for intensive motorized use are available.	All activities used previously plus the following: competitive games, spectator sports, bicycling, jogging, outdoor concerts, and modern resorts.
Urban	Opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. Experiencing the natural environment and the use of outdoor skills are largely unimportant.	Area is characterized by a highly modified environment, although the background may have natural elements. Vegetation is often exotic and manicured. Soil may be protected by surfacing. Sights and sounds of man, onsite, predominate. Large numbers of users can be expected. Modern facilities are provided for the use and convenience of a large number of people. Controls and restrictions are obvious and numerous. Facilities for high intensity motor use and parking are present with forms of mass transit often available.	All activities listed previously.

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CHAPTER 1

PURPOSE AND NEED

INTRODUCTION

This Wilderness Suitability Analysis supplements the multi-resource analysis in the Draft Grand Junction RMP/EIS. The analysis fulfills BLM's Wilderness Study Policy requirements, not covered site-specifically in the RMP/EIS and is specific by alternative, wilderness study area (WSA), and resource issue. Wilderness alternatives were developed to analyze issues ranging from resource production to resource protection. For each alternative, the analysis identifies the impacts relating to WSA recommendations for suitability or unsuitability for wilderness designations. The analysis covers 7 WSAs totaling 241,005 acres, which includes some lands in the Montrose, Colorado and Moab, Utah Districts.

The seven WSAs are listed in Table I-1 and shown in Figure I-1.

Table I-1. Wilderness Study Areas in the Grand Junction Resource Area

WSA/Inventory Number	Acreage
Demaree Canyon/CO-070-009	21,050
Little Book Cliffs/CO-070-066	26,525
Black Ridge Canyons/CO-070-113.....	18,150
Black Ridge Canyons West/CO-070-113A; UT-060-116/117	54,290
The Palisade/CO-070-132	26,050
Dominguez Canyon/CO-070-150; CO-030-363	75,800
Sewemup Mesa/CO-070-176; CO-030-310A	19,140
Total	241,005

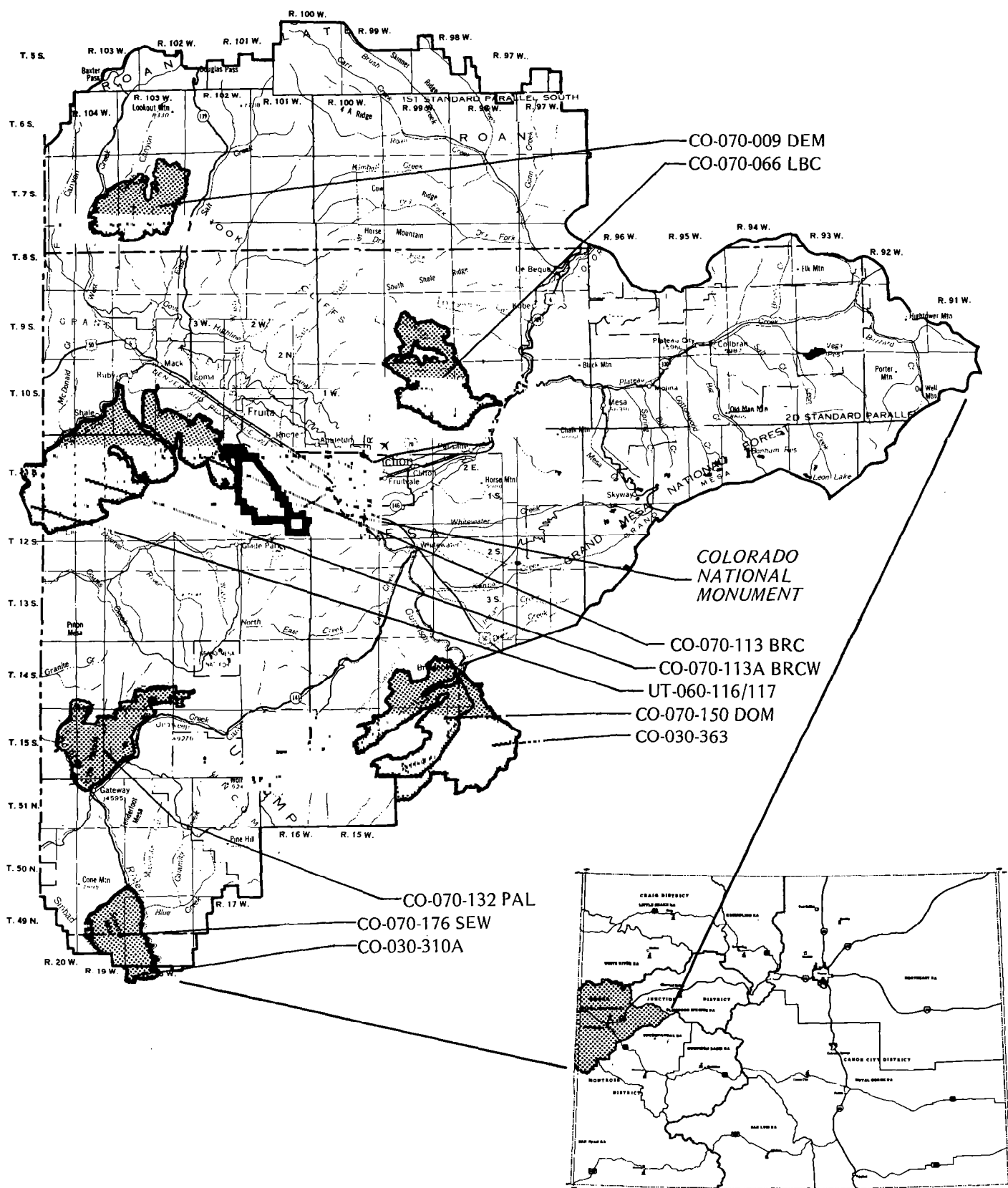


Figure I - 1. Wilderness Study Areas in the Grand Junction Resource Area.

Wilderness Review Process

WILDERNESS REVIEW PROCESS

The *Federal Land Policy and Management Act (FLPMA)* passed by Congress in 1976 directed the BLM to review the public lands it administers and to report by 1991 on the suitability or unsuitability of these lands for wilderness. FLPMA explains that determining whether an area is suitable or unsuitable means determining if an area is more suitable for wilderness designation or more suitable for other uses. To fulfill this mandate BLM developed the following three-phase wilderness review process:

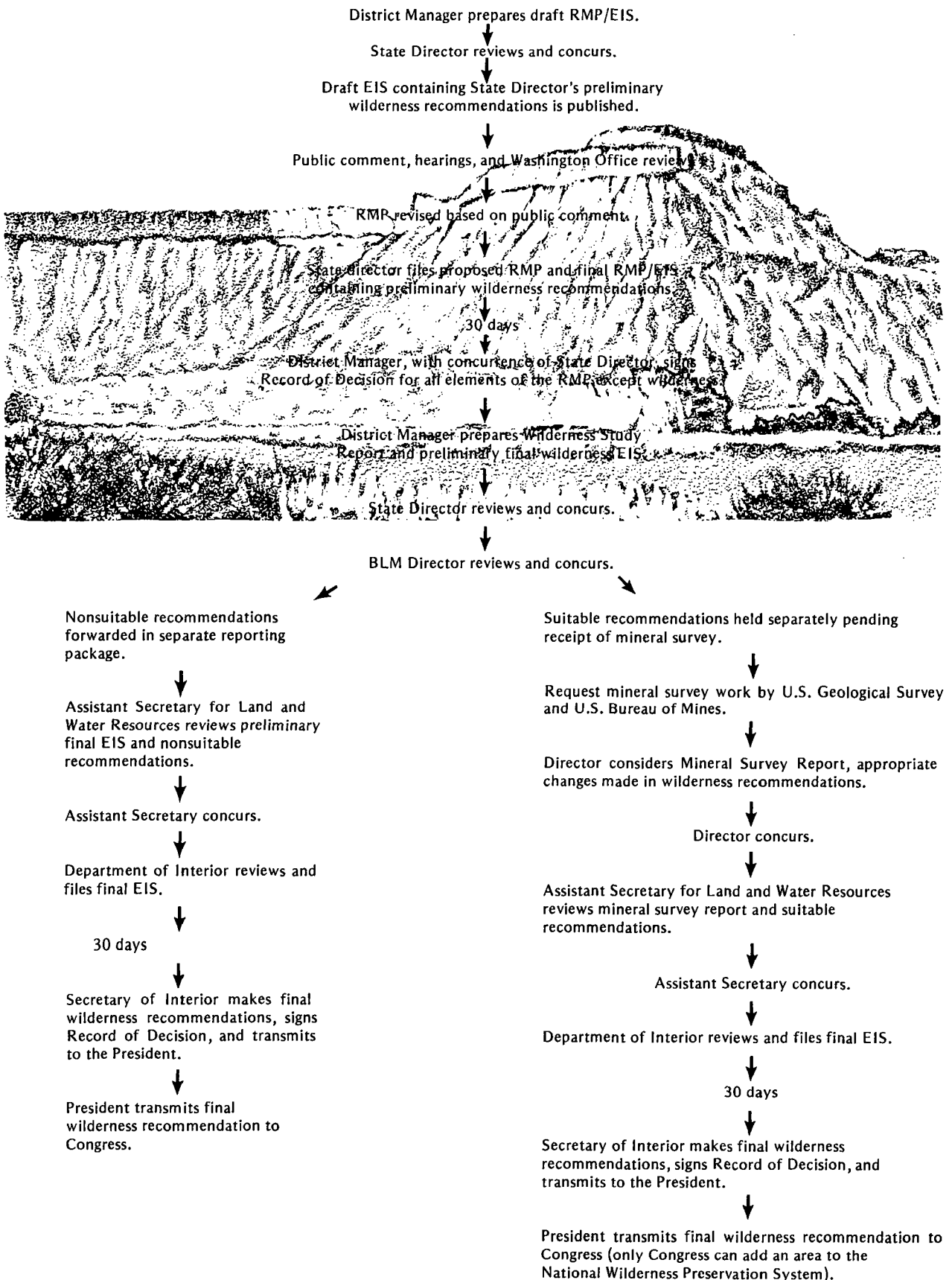
1. **Inventory Phase.** Based on BLM's *Wilderness Inventory Handbook* (1978), public lands were inventoried to determine the presence or absence of wilderness characteristics as defined in the *Wilderness Act* of 1964. In the Grand Junction Resource Area, 7 areas were determined to possess these characteristics and qualified as wilderness study areas (WSAs). This phase was completed in November, 1980 and documented in BLM's *Final Wilderness Study Areas*.
2. **Study Phase.** Based on BLM's *Wilderness Study Policy* (1982), each WSA is studied as to its suitability or unsuitability for wilderness. In the Grand Junction Resource Area, this phase is being done through the Grand Junction Re-

source Management Plan (RMP) which began development in October 1983. The suitability determination is based on evaluation of wilderness values, potential to effectively manage these values, impacts on other resources from wilderness designation, impacts of nondesignation on wilderness values, public review and comment, local social and economic effects from designation, and the consistency of wilderness designation with other plans.

3. **Reporting Phase.** This phase consists of forwarding both suitable and unsuitable recommendations through the Secretary of the Interior and the President, to Congress. Mineral surveys, an environmental impact statement, and other information are also submitted with the recommendations.

The study phase in the Grand Junction Resource Area will end with the Colorado State Director's decision adopting the preliminary wilderness recommendations for submission to the BLM Director. The reporting phase will involve the BLM Director, the Secretary of the Interior, and the President in acting upon the Colorado State Director's preliminary wilderness recommendations. Wilderness recommendations can be termed final only if they are adopted by the Secretary of the Interior and the President for forwarding on to Congress. Figure I-2 is a flow chart of the wilderness reporting process. Detailed information on the process is contained in the BLM's *Wilderness Study Policy*.

**FIGURE 1-2
WILDERNESS REVIEW REPORTING PROCESS FOR THE WILDERNESS STUDY AREAS
IN THE GRAND JUNCTION RESOURCE AREA**



CHAPTER 2

ALTERNATIVES

ALTERNATIVE OBJECTIVES

Alternative Objectives

Six alternatives are being considered: No Action (Continuation of Current Management), No Wilderness (Commodity Production), All Wilderness, Maximum Wilderness (Protection), Manageability and Preferred (Preferred). (Names in parenthesis are the names of the alternatives in Chapter 2, of the RMP.) Public comments on these alternatives will be considered and addressed in both the proposed resource management plan/environmental impact statement and the preliminary final wilderness environmental impact statement.

NO ACTION ALTERNATIVE (CONTINUATION OF CURRENT MANAGEMENT ALTERNATIVE)

The objective is to provide a resource baseline or reference for all WSAs from which to measure changes in wilderness characteristics. Under this alternative there would be a continuation of present levels of resource use and management. All WSAs would be recommended nonsuitable for wilderness designation.

NO WILDERNESS ALTERNATIVE (COMMODITY ALTERNATIVE)

The objective is to provide a scenario for change to wilderness characteristics resulting from emphasizing the availability of public land resources for use and development. All WSAs would be recommended nonsuitable for wilderness designation.

ALL WILDERNESS ALTERNATIVE

The objective is to maximize the WSA acreage that could be preserved as wilderness and identify

resource conflicts and non-wilderness resources foregone. All WSAs (existing boundaries) would be recommended preliminarily suitable for wilderness.

MAXIMUM WILDERNESS ALTERNATIVE (PROTECTION ALTERNATIVE)

The objective is to recommend the maximum acreage preliminarily suitable in each WSA, including adjacent lands, that would enhance the unit's manageability through protection and preservation of its wilderness characteristics. All seven WSAs are recommended preliminarily suitable for wilderness.

MANAGEABILITY ALTERNATIVE

The objective is to recommend as preliminarily suitable those portions of each WSA where wilderness manageability problems and resource conflicts have been eliminated through boundary adjustments. Boundary adjustments could include small expansions. Four WSAs are recommended preliminarily suitable for wilderness designation. Three WSAs are recommended nonsuitable.

PREFERRED ALTERNATIVE (PREFERRED ALTERNATIVE)

The objective is to recommend as preliminarily suitable WSA acreage based on an overall evaluation of wilderness values, resource conflicts and impact analyses, social and economic considerations and the consistency with other plans. Four WSAs are recommended preliminarily suitable and three are recommended nonsuitable.

SUMMARY OF ALTERNATIVES

Table I-2 shows wilderness suitability and nonsuitability recommendations for each alternative.

Chap. 2, Alternatives

Table I-2. Wilderness Alternatives, Grand Junction Resource Area

WSAs	Alternatives											
	No Action ¹ (CCM)		No Wilderness ¹ (CA)		All Wilderness		Maximum Wilderness ¹ (Pro A)		Manageability		Preferred ¹ (PA)	
	S ²	N ³	S	N	S	N	S	N	S	N	S	N
Demaree Canyon.....	0	21,050	0	21,050	21,050	0	24,500	0	0	21,050	0	21,050
Little Book Cliffs.....	0	26,525	0	26,525	26,525	0	28,600	0	0	26,525	0	26,525
Black Ridge Canyons.....	0	18,150	0	18,150	18,150	0	20,185	0	19,595	590	19,595	590
Black Ridge Canyons West...	0	54,290	0	54,290	54,290	0	55,015	0	47,907	7,108	54,342	673
The Palisade.....	0	26,050	0	26,050	26,050	0	26,180	0	19,215	6,835	0	26,050
Dominguez Canyon.....	0	75,800	0	75,800	75,800	0	78,935	0	56,315	19,495	56,315	19,495
Sewemup Mesa.....	0	19,140	0	19,140	19,140	0	19,140	0	18,835	305	18,835	305
Total.....	0	241,005	0	241,005	241,005	0	252,555	0	161,867	81,908	149,087	94,688

¹These alternatives are the same as the RMP/EIS Alternatives (CCM = Continuation of Current Management Alternative, CA = Commodity Alternative, Pro A = Protection Alternative and PA = Preferred Alternative).

²S—Suitable for wilderness designation

³N—Nonsuitable for wilderness designation

⁴Reflects actual acreage for all WSAs including public land in the Montrose, Colorado, and Moab, Utah, Districts.

ALTERNATIVES CONSIDERED BUT ELIMINATED

EXPANSION OF LITTLE BOOK CLIFFS WSA

Consideration was given to expanding the WSA to include the western part of the Little Book Cliffs Wild Horse Range. This would have resulted in a majority of the wild horse range being located within the WSA. If designated wilderness this may have provided a primitive setting for the horses and possibly eliminate conflicting mineral development.

The alternative was eliminated when it was determined that (1) the western boundary road of the WSA is needed for management of the wild horse herd especially during round-ups; and (2) pre-FLPMA oil and gas leases within this area would result in impacts similar to those discussed in the All Wilderness Alternative and would not prevent mineral development conflicts.

SPECIAL FEDERAL ACTION OF PRE- FLPMA LEASES IN DEMAREE CANYON AND LITTLE BOOK CLIFFS WSA

The Demaree Canyon WSA contains 19,300 acres of pre-FLPMA oil and gas leases and 222 acres of a pre-FLPMA coal leases which cover about 92 percent of the WSA. The Little Book Cliffs

WSA contains 22,645 acres of pre-FLPMA oil and gas leases and 1,934 acres of pre-FLPMA coal leases. Although the leases overlap, they cover approximately 85 percent of the WSA. These pre-FLPMA leases have valid existing rights which guarantee the right to develop oil and gas and coal. Because of this conflict with wilderness designation, an alternative was considered for the federal government to suspend, cancel or buy back these leases. The rationale for eliminating this alternative is provided in Section 3 of Appendix E.

ALTERNATIVE SUMMARY BY WILDERNESS STUDY AREA

DEMAREE CANYON WSA

No Action (CCMA) and No Wilderness (CA) Alternatives

The unit would be recommended nonsuitable (21,050 acres) for wilderness. The management emphasis of this WSA would be for continued coal and oil and gas leasing and development. Development would include 43 pre-FLPMA oil and gas leases, 7 post-FLPMA (totally 33 wells projected over 20 years) and 222 acres of a pre-FLPMA coal lease. New utility rights-of-way would be allowed.

Alternative Summary by Wilderness Study Area

All Wilderness Alternative

The unit would be recommended preliminarily suitable (21,050 acres) for wilderness designation and managed according to the BLM's *Wilderness Management Policy*. Pre-FLPMA oil and gas leases on 92 percent of WSA would be allowed to develop due to valid existing rights. The 222 acres of pre-FLPMA coal leases would also be allowed to develop. The WSA would be unsuitable for new rights-of-way except those having valid existing rights.

Maximum Wilderness Alternative (Pro A)

The unit would be recommended preliminarily suitable (24,500 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*. The WSA boundaries would be expanded primarily in the northeast corner to enhance wilderness characteristics and improve wilderness manageability. Pre-FLPMA leases would be allowed to develop including 1,500 acres of pre-FLPMA coal leases. The WSA would be unsuitable to new rights-of-way except those having valid existing rights.

Manageability Alternative

The unit would be recommended nonsuitable (21,050 acres) for wilderness recommendation. A major portion of the unit (92 percent) is under pre-FLPMA oil and gas leases having valid existing rights which prevent identifying any portion of the unit as being manageable for wilderness.

Preferred Alternative (PA)

The unit would be recommended nonsuitable (21,050 acres) for wilderness designation. Management emphasis would be on coal and oil and gas leasing and development. The WSA would be suitable for new rights-of-way.

LITTLE BOOK CLIFFS WSA

No Action Alternative (CCMA)

The unit would be recommended nonsuitable (26,525 acres) for wilderness. The management emphasis in the northern part of the WSA would be on continued coal and oil and gas leasing and development. Emphasis in the southern part would be management of a wild horse herd (65-120 horses) in the Little Book Cliffs Wild Horse Range (WHR). Approximately 18,000 acres of the wild horse range

overlap into the WSA. Development would include 53 pre-FLPMA oil and gas leases, 7 post-FLPMA oil and gas leases and 1,934 acres of pre-FLPMA coal leases (totally 31 wells projected over 20 years). The wild horse range would be closed to coal leasing.

No Wilderness Alternative (CA)

The unit would be recommended nonsuitable (26,525 acres) for wilderness. Management emphasis for the general area would be on continued oil and gas and coal leasing and development. Lease stipulations would be used to protect wild horse foaling and winter range. The Little Book Cliffs Wild Horse Range would be expanded (27,881 to 30,261 acres) and managed for 65-120 horses. Coal leasing would be allowed in the wild horse range.

All Wilderness Alternative

The unit would be recommended preliminarily suitable (26,525 acres) for wilderness designation and managed according to the BLM's *Wilderness Management Policy*. Management of approximately 18,000 acres in the Little Book Cliffs Wild Horse Range would be in accordance with BLM's *Wilderness Management Policy*. Wilderness management would include closing the area to future mineral leasing, but allowing pre-FLPMA leases on 85 percent of the WSA to be developed.

Maximum Wilderness Alternative (Pro A)

The unit would be recommended preliminarily suitable (28,600 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*. The WSA boundaries would be expanded primarily in the Round Mountain area to enhance wilderness manageability. Pre-FLPMA leases would be allowed to develop.

Manageability Alternative

The unit would be recommended nonsuitable (26,525 acres) for wilderness designation. A major part (18,000 acres) of the unit would be managed for 65 to 120 wild horses as part of the Little Book Cliffs Wild Horse Range. Pre-FLPMA oil and gas leases on 85 percent of the WSA preclude identifying any portion of the area as being manageable for wilderness.

Chap. 2, Alternatives

Preferred Alternative (PA)

The unit would be recommended nonsuitable (26,525 acres) for wilderness designation. Management emphasis in the southern portion would be on management of the major part of the unit for 65 to 120 wild horses. The wild horse range would be open for mineral leasing. A power line utility corridor has been identified in Coal Canyon. The northern portion of the WSA would also be open to mineral leasing and development.

BLACK RIDGE CANYONS AND BLACK RIDGE CANYONS WEST WSAs

No Action Alternative (CCMA)

Both units would be recommended nonsuitable (Black Ridge Canyons—18,150 acres; Black Ridge Canyons West—54,290 acres) for wilderness designation. Management emphasis in this alternative would be to designate approximately 68,000 acres in the Black Ridge area as recreation lands to preserve and enhance recreational values. The WSAs would be unsuitable for utility rights-of-way and management and harvest of productive pinyon-juniper woodlands.

No Wilderness Alternative (CA)

Both units would be recommended nonsuitable for wilderness. Management emphasis in this alternative would be to enhance big game and small game habitat as well as maintain riparian habitat. Management and harvest of productive pinyon-juniper stands along a strip (7,435 acres) paralleling the southern boundary of Black Ridge Canyons West would also be emphasized. The WSAs would be suitable for utility rights-of-way and management and harvest of productive pinyon-juniper woodlands.

All Wilderness Alternative

The units would be recommended preliminarily suitable for wilderness designation (Black Ridge Canyons WSA—18,150 acres; Black Ridge Canyons West WSA—54,290 acres) and managed according to BLM's *Wilderness Management Policy*. The WSAs would be unsuitable for utility rights-of-way and management of productive pinyon-juniper woodlands (loss of 6,198 acres).

Maximum Wilderness Alternative (Pro A)

The units would be combined and recommended preliminarily suitable for wilderness designation (Black Ridge Canyons—20,185 acres and Black Ridge Canyons West—55,015 acres). These two WSAs were combined in this alternative to enhance wilderness characteristics and wilderness manageability. The WSAs would be unsuitable for utility rights-of-way and management and harvest of productive pinyon-juniper woodlands (loss of 7,711 acres).

Manageability Alternative

The Black Ridge Canyons WSA and Black Ridge Canyons West WSA would be combined and recommended preliminarily suitable for wilderness (Black Ridge Canyons WSA—19,595 acres; Black Ridge Canyons West WSA—47,907 acres) and managed according to BLM's *Wilderness Management Policy*. A forestry conflict area in the Black Ridge Canyons West WSA resulted in the designation of 6,435 acres as nonsuitable for wilderness. A total of 30 miles of roads would be closed and added into the unit. A small, quarter mile wide, north to south utility corridor would be provided along the eastern boundary.

Preferred Alternative (PA)

The units would be expanded and combined to form a more manageable unit. The combined unit would be recommended preliminarily suitable for wilderness designation (Black Ridge Canyons WSA—19,595 acres; Black Ridge Canyons West WSA—54,342 acres) and managed according to BLM's *Wilderness Management Policy*. Management for wilderness values would restrict management and harvesting of the pinyon-juniper woodlands in Black Ridge Canyons West WSA. A total of 30 miles of roads would be included in this unit. Administrative use of these roads could be allowed consistent with the BLM's *Wilderness Management Policy*. A small quarter mile wide utility corridor would be excluded from the eastern boundary. Lands along the Colorado River (from the south shore north) would be used for floatboating and motor boating Ruby Canyon.

Alternative Summary by Wilderness Study Area

THE PALISADE WSA

No Action Alternative (CCMA)

The unit would be recommended nonsuitable (26,050 acres) for wilderness designation. Management emphasis would be to designate the area as a wildland and protect its recreational settings and opportunities. The Palisade itself would be closed to mineral leasing (2,803 acres). The WSA would be unsuitable for management and harvest of productive pinyon-juniper woodlands.

No Wilderness Alternative (CA)

The unit would be recommended nonsuitable (26,050 acres) for wilderness. Management of the general area would be for oil and gas leasing and development and management and harvest of pinyon-juniper woodlands (797 acres). The unit would be managed as part of an extensive recreation management area. Management emphasis on the northern part of the WSA would be to maintain riparian habitat and improving big game habitat.

All Wilderness Alternative

The unit would be recommended preliminarily suitable (26,050 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*. The area would be closed to mineral leasing and mineral entry. Pinyon-juniper woodlands would not be managed or harvested. Off-road vehicles would not be permitted in the WSA.

Maximum Wilderness Alternative (Pro A)

The unit would be recommended preliminarily suitable (26,180 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*. Two cherry-stemmed roads would be closed to improve wilderness manageability.

Manageability Alternative

The unit would be recommended preliminarily suitable (19,215 acres) for wilderness designation. Two areas, totaling about 6,000 acres, would be designated nonsuitable and excluded from the unit to enhance management. Several trail rights-of-way would be acquired to enhance opportunities for primitive and unconfined recreation. A parcel of productive pinyon-juniper woodland would be excluded from the east end to minimize conflict with forestry. Resource conflicts associated with wilder-

ness, forestry and off-road vehicles would reduce the size of the unit by 6,835 acres.

Preferred Alternative (PA)

The unit would be recommended nonsuitable (26,050 acres) for wilderness designation. The emphasis of the area would be on protection of scenic and natural values of The Palisade, management of pinyon-juniper woodlands, and oil and gas leasing. The Palisade (1,920 acres) would be designated an Outstanding Natural Area and managed to protect scenic values. Configuration, steep slopes, and potential trespass problems prevented the unit from being recommended for wilderness in this alternative.

DOMINGUEZ CANYON WSA

No Action Alternative (CCMA)

The unit would be recommended nonsuitable (75,800 acres) for wilderness designation. Management emphasis would be to designate the area as a wildland and protect its recreational settings and opportunities. The WSA would be unsuitable for management and harvest of productive pinyon-juniper woodlands (9,164 acres).

No Wilderness Alternative (CA)

The unit would be recommended as nonsuitable (75,800 acres) for wilderness designation. Management emphasis would be on enhancing wildlife habitat for big and small game and maintaining riparian habitat. The upper benches of the unit would be managed for pinyon-juniper production (9,164 acres).

All Wilderness Alternative

The unit would be recommended preliminarily suitable (75,800 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*.

Maximum Wilderness Alternative (Pro A)

The unit would be recommended preliminarily suitable (78,935 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*. The WSA boundaries were expanded to enhance wilderness characteristics and improve wilderness manageability. Three cherry-

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stemmed roads totaling 8 miles would be closed and added to the unit as well as about 1,000 acres on Long Mesa to enhance manageability for wilderness. Roads could still be used for administrative purposes if determined consistent with BLM wilderness policy.

Manageability and Preferred Alternatives (PA)

A major portion of the unit would be recommended preliminarily suitable (56,315 acres suitable; 19,495 acres unsuitable) and managed according to BLM's *Wilderness Management Policy*. Resource conflicts with forestry resources excluded 2,642 acres from the unit. Approximately 19,000 acres were excluded from the southern and eastern boundaries to enhance wilderness manageability and prevent conflicts with adjacent private lands.

SEWEMUP MESA WSA

No Action Alternative (CCMA)

The unit would be recommended nonsuitable (19,140 acres) for wilderness designation. Management emphasis would be to designate the area as a wildland and protect its recreational settings and opportunities. Facilities as part of the Sinbad Valley Salinity Control Project could be built in the WSA. The mesa top would be closed to oil and gas leasing (12,197 acres) and the balance of the unit would be open to leasing primarily subject to the no surface occupancy stipulation. The unit would be unsuitable for utility rights-of-way.

No Wilderness Alternative (CA)

The unit would be recommended nonsuitable (19,140 acres) for wilderness. Management of the general area would be for oil and gas leasing and

development and management of productive pinyon-juniper. Sewemup Mesa and Sinbad Valley would be managed as part of an extensive recreation management area. Facilities in Salt Creek as part of the Sinbad Valley salinity control project could be built. Utility rights-of-way would be allowed in the unit.

All Wilderness Alternative

The unit would be recommended preliminarily suitable (19,140 acres) for wilderness designation and managed according to BLM's *Wilderness Management Policy*. Facilities in Sinbad Valley for the salinity control project would not be allowed.

Maximum Wilderness Alternative (Pro A)

For this WSA, there is no maximum wilderness alternative.

Manageability and Preferred Alternatives (PA)

A major portion of the unit would be recommended preliminarily suitable (18,835 acres) and managed according to BLM's *Wilderness Management Policy*. A very small portion would be recommended unsuitable (305 acres) due to the need for utility rights-of-way and the Sinbad Valley salinity control project. The western boundary was slightly realigned to enhance manageability for wilderness.

COMPARISON OF IMPACTS BY ALTERNATIVE

Tables I-3 summarize the major impacts by WSA, issue resource and alternative. For more detailed impact discussion, refer to Chapter 4.

Table I-3. Comparative Summary of Impacts

Impacts on	Alternative					
	No Action	No Wilderness	All Wilderness	Maximum Wilderness	Manageability	Preferred
Demaree Canyon WSA						
Wilderness	Loss of wilderness values (21,050 acres). Failure to expand diversity of national wilderness preservation system (Colorado Plateau ecotype).	Same as No Action Alternative.	Pre-FLPMA oil and gas leases on 92 percent of WSA create impacts similar to No Action/No Wilderness.	Same as All Wilderness Alternative.	Pre-FLPMA oil and gas leases prevent BLM from being able to manage this WSA as wilderness.	Unmanageable for wilderness because of pre-FLPMA leases. Recommending as nonsuitable would result in a loss of wilderness values which is a major adverse impact over the long term and a moderate adverse impact from not expanding the diversity of the National Wilderness Preservation System.
Coal	Continued exploration and development of 222 acres of coal leases. Further leasing and development of 20,828 acres.	Same as No Action Alternative.	Development allowed on 222 acres of pre-FLPMA leases. No leasing of 20,828 acres. Loss of about 274 million short tons.	Development allowed on 1,500 acres of pre-FLPMA leases. No further leasing. Loss of 274 million short tons of coal.	Not Applicable	Further leasing/development would allow recovery of 277 million short tons of coal in WSA. Considered a moderate beneficial impact over the long term.
Oil and Gas	Development of 21,050 acres of existing leases resulting in 33 new wells, 33 miles of roads and 19 miles of pipeline over 20 years (57 percent projected success).	Same as No Action Alternative.	Ninety-two percent of WSA with pre-FLPMA leases developed. Eight percent of WSA with post-FLPMA leases not developed (7 wells).	Similar to All Wilderness Alternative. Additional land in this alternative has pre-FLPMA oil and gas leases.	Not Applicable	Development of all leases (20 years) would ensure recovery of part of WSA's oil and gas reserve. Considered a major beneficial impact over the long term.
Recreation	The SPNM ¹ setting—without roads and nonmotorized recreation—would shift to a rural, roaded landscape and motorized recreation.	Same as No Action Alternative.	Pre-FLPMA oil and gas leases would create impacts similar to No Action/No Wilderness.	Same as All Wilderness Alternative.	Not Applicable	Same as No Action and No Wilderness Alternatives. Considered a low to moderate adverse impact over the long term.

Table I-3. Comparative Summary of Impacts—Continued

Impacts on	Alternative					
	No Action	No Wilderness	All Wilderness	Maximum Wilderness	Manageability	Preferred
Visual Resources	Natural landscape would become developed, oil field/surface coal facilities. Changes in landform would be evident from oil/gas pads and road cuts.	Same as No Action Alternative.	Pre-FLPMA oil and gas leases would create impacts similar to No Action and No Wilderness Alternatives.	Same as All Wilderness Alternative.	Not Applicable	Same as No Action and No Wilderness Alternatives. Considered a major adverse impact over the long term.
Utility Rights-of-Way	New pipelines would be constructed inside western edge of WSA (West Salt Creek).	Same as No Action Alternative.	New pipelines would not be allowed inside WSA unless they have valid existing rights.	Same as All Wilderness Alternative.	Not Applicable	Future pipelines could be routed through WSA. Less environmental damage would occur in same parts of West Salt Creek.
Little Book Cliffs WSA						
Wilderness	Loss of wilderness values (26,525 acres) including special features. Failure to expand diversity of National Wilderness Preservation System (Colorado Plateau ecotype).	Same as No Action Alternative.	Pre-FLPMA oil and gas leases on 85 percent of WSA creates impacts similar to No Action and No Wilderness Alternatives.	Same as All Wilderness Alternative.	Pre-FLPMA oil and gas and coal leases prevent BLM from being able to manage this WSA as wilderness.	Unmanageable for wilderness because of pre-FLPMA leases. Recommending as unsuitable would result in a loss of wilderness values and a failure to expand the diversity of the National Wilderness Preservation System. These are major adverse, long-term impacts.
Coal	Continued exploration and development of 1,934 acres. Further leasing of WSA outside wild horse range (about 6,000 acres).	Continued exploration and development of 1,934 acres. Further leasing and development of 24,591 acres (349 million short tons).	Development would continue on 1,934 acres of pre-FLPMA leases. No leasing of 24,591 acres (323 million short tons).	Same as All Wilderness Alternative.	Not Applicable.	Further leasing and development would ensure recovery of 349 million short tons. Considered a moderate beneficial impact over the long term.

Oil and Gas	Development of 26,525 acres of existing leases resulting in 31 new wells, 31 miles of new roads, and 18 miles of new pipelines over 20 years (57 percent predicted success).	Same as No Action Alternative.	Eighty-five percent of WSA with pre-FLPMA leases developed. Eight percent of WSA with post-FLPMA not developed.	Similar to All Wilderness Alternative. Additions to WSA have pre-FLPMA oil and gas leases.	Not Applicable.	Development of all leases (20 years) would ensure recovery of part of WSA's oil and gas reserve. Considered a major beneficial impact over the long term.
Wild Horses	Loss of primitive landscape for wild horse range. Wild horses would probably adapt to mineral development, but coal activity in Coal Canyon could reduce herd by 10 percent.	Same as No Action Alternative.	Primitive setting would not be maintained because 85 percent of WSA has pre-FLPMA oil and gas leases.	Same as All Wilderness Alternative.	Not Applicable.	Impacts similar to No Action and No Wilderness Alternatives. Future coal leasing would include stipulations to ensure viability of herd. Overall, mineral development would have a minor adverse impact on wild horses.
Recreation	Primitive landscape with non-motorized recreation would shift to more natural developed landscape (oil and gas and coal) and motorized recreation.	Same as No Action Alternatives.	Pre-FLPMA oil and gas leases would create impacts similar to No Action and No Wilderness Alternatives.	Same as All Wilderness Alternative.	Not Applicable.	Same impacts as No Action and No Wilderness Alternatives. Considered a moderate adverse impact over the long term.
Visual Resources	Natural landscape would become landscape of oil and gas pads, roads, pipelines and coal mining facilities. Changes in landform would be evident from oil and gas and road cuts.	Same as No Action Alternative.	Pre-FLPMA oil and gas leases would create impacts similar to No Action and No Wilderness Alternatives.	Same as All Wilderness Alternative.	Not Applicable.	Same as No Action and No Wilderness Alternatives. Overall, impacts would be moderate to major adverse impacts over the long term.
Utility Rights-of-Way	No new rights-of-way on approximately 18,000 acres (wild horse range). New rights-of-way permitted on remainder of area. Pre-FLPMA rights-of-way allowed throughout WSA.	Same as No Action Alternative.	No new rights-of-way except for pre-FLPMA rights.	Same as All Wilderness Alternative.	Not Applicable.	Rights-of-way would be allowed. Special efforts would be required to protect wild horses. Considered a minor beneficial impact over the long term.

Table I-3. Comparative Summary of Impacts—Continued

Impacts on	Alternative					
	No Action	No Wilderness	All Wilderness	Maximum Wilderness	Manageability	Preferred
Black Ridge Canyons WSA						
Wilderness	Loss of long term protection of wilderness values including special feature. Failure to expand ecological diversity of NWPS.	Same as No Action Alternative.	Maintenance of wilderness values including special features. Expansion of ecological diversity, Colorado Plateau representation in NWPS.	Similar to All Wilderness Alternative. Removal of cherry-stemmed roads and adjacent land enhance outstanding opportunities for solitude and naturalness. This unit and Black Ridge Canyons West would be merged.	Similar to All Wilderness and Maximum Wilderness Alternatives. Two miles of north boundary and four miles of Ute Trail and one-quarter mile strip on eastern boundary would be excluded, having a minor impact on wilderness.	Same as Manageability Alternative. Suitable recommendations would be a major beneficial impact to NWPS over the long term.
Wildlife	Suitable habitat would be provided for bighorn sheep. Vegetation treatment would be implemented.	Maintain/improve wildlife habitat especially for bighorn sheep, deer and wild turkey. Vegetation treatment and forestry practices would enhance habitat.	Wildlife habitat improvements would be required to be compatible with protection of wilderness values.	Same as All Wilderness Alternative.	Same as All Wilderness Alternative.	Same as All Wilderness Alternative. Overall, very minor adverse impact to wildlife.
Recreation	SPNM setting generally maintained.	SPNM setting would shift toward more rural, motorized setting except in canyons.	SPNM settings maintained. Primitive recreation use increase annually 10-15 percent.	Primitive recreation setting enhanced through removal of cherry-stemmed roads and addition of adjacent lands. Opportunities for outstanding primitive recreation enhanced.	Same as Maximum Wilderness Alternative.	Same as Maximum Wilderness Alternative. Overall, major beneficial impact to recreation over long term.
Off-Road Vehicles	ORV use limited to existing roads/trails. Some expansion of road system.	Increased trail oriented ORV use.	Closed to ORV use except cherry-stemmed roads. Motorized access to Rattlesnake Arches available to within 1 mile.	Closed to ORVs. Loss of ORV opportunities throughout WSA including loss of motorized access to within 1 mile of Rattlesnake Arches.	Similar to Maximum Wilderness Alternative. Ute Trail would be excluded from unit to allow motorized access within 1 mile of Rattlesnake Canyon Arches.	Similar to Maximum Wilderness Alternative. Ute Trail would be excluded from unit to allow motorized access within 1 mile of Rattlesnake Canyon Arches. Minor adverse impacts to ORVs, over long term.

Transportation	Continued use of existing roads and trails.	Continued use of transportation system. Access improved by legal access at Pollock Canyon.	Use on all existing roads outside boundary. Legal access and trailhead provide at Pollock Canyon.	Approximately 7 miles of cherry-stemmed roads added into WSA. Roads would be closed except to limited administrative use.	Similar to Maximum Wilderness Alternative. Motorized boat access on north boundary enhanced.	Similar to Maximum Wilderness Alternative. Motorized boat access on north boundary enhanced. Minor adverse impact on transportation over long term.
Utility Rights-of-Way	Unsuitable for utilities. Adverse impacts to rural communities in area.	Small utilities permitted across WSA if resource values could be protected.	Unsuitable for utilities. Adverse impacts to rural communities in area.	Unsuitable for utilities. Adverse impacts to rural communities in area.	Unsuitable for utilities. Small utility corridor provided on eastern boundary.	Same as Manageability Alternative. Overall, low adverse impact on utility rights-of-way.

Black Ridge Canyons West WSA

Wilderness	Loss of long term protection of wilderness values including special feature. Failure to expand ecological diversity of NWPS.	Same as No Action Alternative.	Maintenance of wilderness values including special features. Expansion of ecological diversity, Colorado Plateau representation in NWPS.	Similar to All Wilderness Alternative. This unit and Black Ridge Canyons would be merged. Three cherry-stemmed roads added into unit which would enhance outstanding opportunities for solitude and naturalness.	Similar to All Wilderness and Maximum Wilderness Alternatives. Seven miles of north boundary would be excluded which would have minor adverse impact on wilderness values.	Similar to All Wilderness and Maximum Wilderness Alternatives. Seven miles of north boundary would be excluded which would have minor adverse impact on wilderness values. Overall, major beneficial impact to NWPS over the long term.
Forestry	7,435 acres of productive pinyon-juniper woodland unsuitable for management and harvest.	6,198 acres of productive pinyon-juniper woodland suitable for management and harvest..	Same as No Action Alternative.	7,711 acres of productive pinyon-juniper woodland unsuitable for management and harvest.	Impact same as No Wilderness Alternative.	All productive pinyon-juniper woodlands would be unsuitable for management and harvest. Considered a minor adverse impact to forestry over long term.
Wildlife	Suitable habitat would be provided for bighorn sheep. Vegetation treatment would be implemented.	Maintain/improve wildlife habitat especially for bighorn sheep, deer and wild turkey. Vegetation treatment and forestry practices would enhance habitat.	Wildlife habitat improvements would be required to be compatible with protection of wilderness values.	Same as All Wilderness Alternative.	Same as All Wilderness Alternative.	Same as All Wilderness Alternative. Overall, very minor adverse impact to wildlife.
Recreation	SPNM and P settings generally maintained.	SPNM and P settings would shift more toward rural, motorized settings except in canyons.	SPNM and P settings maintained. Primitive recreation use increases annually 10-15 percent.	Primitive recreation setting enhanced through removal of cherry-stemmed roads. Opportunities for outstanding primitive recreation enhanced.	Similar to Maximum Wilderness Alternative.	Similar to Maximum Wilderness Alternative. Overall, major beneficial impact to recreation over the long term.

Table I-3. Comparative Summary of Impacts—Continued

Impacts on	Alternative					
	No Action	No Wilderness	All Wilderness	Maximum Wilderness	Manageability	Preferred
Off-Road Vehicles	ORV use limited to existing roads/trails. Some expansion of road system.	Increased trail oriented ORV use.	Closed to ORV use except cherry-stemmed roads. Minimal use impacted.	Closed to ORVs. Motorized access to Colorado River no longer allowed.	Same as Maximum Wilderness Alternative.	Same as Maximum Wilderness Alternative. Minor adverse impacts to ORVs over the long term.
Transportation	Continued use of existing roads and trails.	Continued use of transportation system. Some trespass along Colorado River.	Continued use of existing roads. Trailheads developed at Mee, Knowles, and Jones Canyons. Trespass problems along Colorado River continue.	Approximately 23 miles of primarily cherry-stemmed roads added into WSA. Roads would be closed except for limited administrative use.	Similar to Maximum Wilderness Alternative. Motorized boat access on north boundary enhanced.	Similar to Maximum Wilderness Alternative. Motorized boat access on north boundary enhanced. Minor adverse impacts to transportation over the long term.
The Palisade WSA						
Wilderness	Loss of wilderness values including special features except for the rocky spine called The Palisade. Failure to expand diversity of NWPS (Colorado Plateau ecotype).	Same as No Action Alternative but loss of values would occur sooner.	Maintenance of wilderness values including special features. Expansion of ecological diversity, Colorado Plateau representation in NWPS.	Same as All Wilderness Alternative. Addition of 2 cherry-stemmed roads would enhance wilderness values.	Similar to All Wilderness Alternative. Removal of ORV conflict areas would help make WSA manageable for wilderness. Trail rights-of-way would also be acquired to enhance manageability.	Similar to No Action Alternative. Loss of wilderness values would be a major adverse impact in the long term. Failure to expand the diversity of the National Wilderness Preservation System would be a moderate to major adverse impact over the long term.
Locatable Minerals	Open to location, no impacts.	Same as No Action Alternative.	Closed to mineral entry (WSA considered to have low potential).	Same as All Wilderness Alternative.	Same as All Wilderness Alternative.	Open to location, no adverse impact to locatable minerals.
Oil and Gas	No leasing on The Palisade (2,803 acres). Balance of area unassigned pending lease application.	Entire WSA (26,050 acres) open to leasing/development.	Closed to mineral leasing.	Same as All Wilderness Alternative.	Single, pre-FLPMA lease (120 acres) excluded. Closed to leasing.	Open to leasing except for The Palisade (1,920 acres). Minor adverse impact to oil and gas over the long term.

Forestry	1,654 acres of productive pinyon-juniper woodlands unsuitable for management/harvest.	797 acres of productive pinyon-juniper suitable for management/harvest.	Same as No Action Alternative.	Same as No Action Alternative.	Unsuitable for management/harvest of pinyon-juniper woodlands except for 797 acres excluded from east boundary.	Suitable for productive pinyon-juniper management/harvesting with special stipulations to protect scenic values. Moderate beneficial impact to forestry over the long term.
Recreation	SPNM setting maintained in short term, shifting to SPM in long term. ORV use growing steadily.	Shift of SPNM settings to SPM. Displacement of primitive recreation with motorized recreation on more accessible parts of area.	SPNM setting maintained. Closed to motorized use resulting in loss of about 2,000 visitor days per year.	Same as All Wilderness Alternative. Would enhance outstanding opportunities for primitive recreation. Motorized use closed on cherry-stemmed roads.	Same as All Wilderness Alternative. Acquiring rights-of-way would enhance opportunities for outstanding primitive and unconfined recreation. ORV opportunities would be restored in unit.	Outstanding natural area (ONA) designation on The Palisade (1,920 acres) would maintain natural and scenic values. Major adverse impact to primitive recreation over the long term. ORV opportunities continue outside ONA. Minimal adverse impact to ORVs over the long term.

Dominguez Canyon WSA

Wilderness	Loss of long term protection of wilderness values including special feature. Failure to expand ecological diversity of NWPS.	Same as No Action Alternative.	Maintenance of wilderness values including special features. Expansion of ecological diversity, Colorado Plateau representation in NWPS.	Similar to All Wilderness Alternative. Adding cherry-stemmed roads would enhance wilderness values.	Impacts would be similar to the All Wilderness and Maximum Wilderness Alternatives. Boundary modifications would enhance manageability for wilderness.	Same as Manageability Alternative. Overall, major beneficial impact to NWPS over the long term.
Locatable Minerals	Open to locatable minerals.	Same as No Action Alternative.	Closed to mineral location.	Closed to mineral location. Mining road in Big Dominguez would be closed.	Impacts same as Maximum Wilderness Alternative.	Impacts same as Maximum Wilderness Alternative. Closed to mineral location which would be a minor adverse impact over the long term.
Forestry	About 9,164 acres of productive pinyon-juniper woodland unsuitable for management/harvest.	Same as No Action Alternative.	Same as No Action Alternative.	Impacts would be similar to All Wilderness except 1,100 acres of productive woodland would be added to unsuitable designation.	Boundary adjustments would allow 2,642 acres to be suitable for pinyon-juniper management/harvest. Approximately 6,522 acres would be unsuitable.	Loss of 6,522 acres of productive pinyon-juniper woodland would be a moderate adverse impact over the long term.

Table I-3. Comparative Summary of Impacts—Continued

Impacts on	Alternative					
	No Action	No Wilderness	All Wilderness	Maximum Wilderness	Manageability	Preferred
Wildlife	Suitable habitat would be provided for bighorn sheep. Vegetation treatment would be implemented.	Same as No Action Alternative. Forest practices would enhance wildlife.	Wildlife habitat improvements would be required to be compatible with protection of wilderness values.	Impacts similar to All Wilderness Alternative.	Impacts similar to All Wilderness Alternative.	Wildlife habitat improvements would have to be compatible with protection of wilderness values. Constraints imposed would be very minor adverse impacts on wildlife.
Livestock Grazing	Star Mesa stock trail in Big Dominguez Canyon would be constructed.	Same as No Action Alternative.	Star Mesa trail not constructed. Trailing problem not corrected, no use of forage on Star Mesa.	Impacts same as All Wilderness Alternative.	Impacts same as All Wilderness Alternative. Allotment management plan not implementable.	Star Mesa stock trail might not be built. Moderate adverse impacts over the long term.
Recreation	P and SPNM settings maintained over the short term. Some shifting to SPM over the long term.	P and SPNM settings would shift toward SPNM and SPM respectively. Loss of primitive recreation opportunities.	SPNM settings maintained. Primitive recreation use increase annually 10-15 percent.	Impacts similar to All Wilderness Alternative. Additions to WSA would enhance outstanding opportunities for primitive recreation.	Impacts similar to Maximum Wilderness Alternative. Boundary adjustments would minimize trespass and enhance manageability. Areas deleted have minimal impact on recreation.	Impacts similar to Maximum Wilderness Alternative. Maintenance of primitive recreation major beneficial impact over the long term.
Land Tenure	No proposed land acquisitions.	No proposed acquisitions.	Approximately 920 acres acquired from state and private landowner. State and landowner generally supportive.	Impacts same as All Wilderness Alternative.	Impacts same as All Wilderness Alternative.	Acquisition of 920 acres would enhance wilderness manageability and be a major beneficial impact to wilderness over the long term.
Transportation	No transportation impacts.	No transportation impacts.	Trailheads at Bridgeport and Big Dominguez campground maintained. Gunnison Gulch developed as trailhead.	Impacts similar to All Wilderness except 8 miles of cherry-stemmed roads would be closed. Use on these roads is minimal.	Impacts similar to Maximum Wilderness. One mile of jeep road excluded from unit.	Closure of 7 miles of road would have minor adverse impact on recreationists. Administrative access permitted consistent with BLM wilderness management policy. Overall, minor adverse impact on transportation.

Sewemup Mesa WSA

Wilderness	Loss of long term protection of wilderness values including special feature. Failure to expand ecological diversity of NWPS.	Same as No Action Alternative.	Maintenance of wilderness values including special features. Expansion of ecological diversity, Colorado Plateau representation in NWPS.	Note: There is no Maximum Wilderness Alternative for this WSA.	Similar to All Wilderness Alternative. Minor boundary changes would have minimal impact on wilderness values.	Similar to All Wilderness Alternative. Minor boundary changes would have minimal impact on wilderness values. The addition of this unit to the NWPS would be a major long term beneficial impact.
Water Resources	Low profile cut-off wall and associated facilities as part of Sinbad Valley salinity project could be built in WSA.	Same as No Action Alternative.	Cut-off wall could not be built inside WSA. Salinity project might not be done. Five to seven thousand tons of salt added to Colorado River Basin annually.	Note: There is no Maximum Wilderness Alternative for this WSA.	Boundary modification would allow construction of project.	Boundary modification would allow construction of project. This would be a moderate beneficial impact over the long term to salinity control in the Colorado River Drainage.
Locatable Minerals	Open to locatable minerals.	Same as No Action Alternative.	Closed to locatable minerals (low potential).	Note: There is no Maximum Wilderness Alternative for this WSA.	Closed to locatable minerals. No known mineralization in WSA.	Closed to locatable minerals. No known mineralization in WSA. Low to moderate adverse impact over the long term.
Oil and Gas	12,197 acres closed to leasing. Of 6,943 acres available for leasing, majority would be subject to no surface occupancy stipulation.	19,140 acres available for leasing and development.	No leasing. Any oil and gas reserve foregone (moderate potential for development).	Note: There is no Maximum Wilderness Alternative for this WSA.	East boundary modified to allow oil and gas leasing and development. 18,805 acres closed to leasing.	East boundary modified to allow oil and gas leasing and development. 18,805 acres closed to leasing which is considered a minor adverse impact over the long term.
Recreation	P setting on mesa top maintained. Lower area would shift from SPNM to SPM. Some loss of primitive recreation opportunities.	P settings would shift toward SPN and SPNM in lower elevations would become SPM. Some loss of primitive recreation opportunities.	P and SPNM setting maintained. Primitive recreation use increase 10-15 percent annually.	Note: There is no Maximum Wilderness Alternative for this WSA.	Same as All Wilderness Alternative.	Same as All Wilderness Alternative. Considered major beneficial impact to recreation over the long term.

Comparison of Impacts by Alternative

Utility Rights-of-Way	Unsuitable for utilities.	Suitable for utilities. No specific proposals to date.	Unsuitable for utilities.	Note: There is no Maximum Wilderness Alternative for this WSA.	Boundary modifications on east side would provide for future utilities along Highway 141. Remainder of the area unsuitable for utilities.	Boundary modifications on east side would provide for future utilities along Highway 141. Remainder of the area unsuitable for utilities which is a minor adverse impact over the long term.
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¹Recreation opportunity spectrum settings are explained in Appendix H.

CHAPTER 3

AFFECTED ENVIRONMENT

IDENTIFICATION OF ISSUES BY WSA.

At the beginning of the Grand Junction RMP/EIS, the BLM, the general public, other federal agencies, and state and local governments identified issues and management concerns for the planning unit. Issues addressed in the RMP that are applicable to wilderness management are addressed in the following chapters and are divided into issues common to all WSA and issues specific to WSAs. Some management concerns and resources were not considered wilderness issues and are discussed as non-issues. Refer to Chapter 1 of the Grand Junction RMP/EIS for a complete listing of wilderness management issues.

NON-ISSUE/RESOURCES COMMON TO WSAs

AIR QUALITY

Under the Clean Air Act (as amended, 1977), all BLM land, including the seven WSAs, were given a Class II air quality classification. This allows moderate deterioration associated with moderate, well-controlled industrial and population growth.

SOILS

Soil inventories are available in the Grand Junction Resource Area for each of the WSAs. With the exception of approximately 2,500 acres of soils having a high slump hazard in the Demaree Canyon WSA and the presence of some soils with high erosion potentials in all WSAs, no soil-related issues or problems occur in these areas.

WATER RESOURCES

The seven WSAs lie within the upper Colorado River Basin. Perennial waters within this basin typically have seasonal flow variation. Peak flows

occur in May and June in response to snowmelt. Low flows generally occur in winter when surface runoff is minimal.

Ephemeral stream channels or canyons drain all the WSAs and have stream flow only during snowmelt periods and in response to summer thunderstorm activity. Very short intermittent stream sections exist in Black Ridge Canyons, Black Ridge Canyons West, Dominguez Canyon, and Little Book Cliffs where ground water surfaces in springs and seeps. Only Dominguez Canyon WSA has adequate precipitation and ground water to support perennial flows in Little and Big Dominguez Creeks.

THREATENED AND ENDANGERED SPECIES

As expected of roadless areas in western Colorado, all seven WSAs contain excellent cliffs for raptor nesting. The Book Cliffs of the Little Book Cliffs and Demaree Canyon WSAs are distinguished by the relatively high concentration of prairie falcon nests. Black Ridge Canyons, Black Ridge Canyons West, The Palisade, and Sewemup Mesa WSAs have actual or potential nest sites of the endangered peregrine falcon. Golden eagles nest on suitable cliffs in all seven areas. Wintering bald eagles hunt in all the WSAs, but concentrations occur along the rivers at the edges of Black Ridge Canyons West, Black Ridge Canyons, Dominguez Canyon, The Palisade and Sewemup Mesa. Black Ridge Canyons and Black Ridge Canyons West border the Colorado River where four endemic and endangered fish species occur. The order of endangerment for these species are the Colorado River squawfish, humpback chub, razorback chub, razorback sucker and the bonytail chub. The threatened Uinta Basin hookless cactus and the endangered spineless hedgehog cactus are known to occur only in the Dominguez Canyon WSA.

Additional species of plants and animals considered sensitive due to rarity or restricted size of range, occur within the WSAs. Those that occur within the WSAs are: the Great Basin silverspot butterfly and Dolores skeletonweed in The Palisade WSA; Will Minor's short-tailed swallowtail butterfly and its host plant Eastwood biscuitroot in the Black Ridge WSAs; canyon treefrog, Jones' amsonia, Osterhouts' catseye, and Grand Junction melkvetch in

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the two Black Ridge WSAs and Dominguez Canyon WSA.

VISUAL RESOURCES

Visual resources in the seven WSAs have been classified according to the BLM's visual resource management (VRM) system. The glossary in Appendix K explains the visual resource management classes. Visual Resource Management classes are based on an area's inherent visual qualities, visual sensitivity and distance from the viewer. Ratings are based on BLM's 8400 Manual on visual resource management. Visual resources in all WSAs, except Demaree Canyon and Little Book Cliffs, are considered non-issues due to the low potential of surface-disturbing activities.

LAND TENURE

Disposal

None of the public land within the WSAs has been recommended for disposal.

Acquisition

Two parcels, one state land and the other private land, containing a total of 920 acres located within the Dominguez Canyon WSA would be recommended for acquisition.

Withdrawals

Six of the seven WSAs contain withdrawn lands that have some type of restrictions (i.e. on mining location or disposition of public land). The Bureau of Reclamation withdrawals along the Gunnison River (Dominguez Canyon WSA) would be used for the Dominguez dam project should it be authorized by Congress. Power site withdrawals are located in Black Ridge Canyons, The Palisade and Sewemup Mesa. Several WSAs have public water reserves.

FIRE

The majority of fires within the WSAs are caused by lightning and usually are less than 1 acre. The major fuel types in the areas are pinyon-juniper, with grass and sagebrush understory, and parks of grass and sagebrush. The potential for prescribed fires in the WSAs is good due to the frequency of

natural barriers and the distance from any threatened values.

Fire has a natural role in the ecosystem of these areas and fire suppression practices have led to changes in the natural successional stages for all the WSAs.

ISSUE RESOURCES COMMON TO WSAs

OIL AND GAS

Four of the WSAs (Black Ridge Canyons, Black Ridge Canyons West, The Palisade, and Dominguez Canyon) have low oil and gas development potential. Only The Palisade (120 acres) has been leased for oil and gas. There has been no drilling activity in any of these areas. The Sewemup Mesa WSA has moderate development potential and a low level of activity is projected. However, there are no current oil and gas leases within the area.

The Demaree Canyon and Little Book Cliffs WSAs have high development potential and a moderate to high level of activity is projected. Both areas contain extensive pre-FLPMA oil and gas leases (see Affected Environment, Chapter 3, Oil and Gas). There are eight pending applications for permit to drill (APDs) in the Little Book Cliffs WSA.

PALEONTOLOGICAL RESOURCES

The Black Ridge Canyons West WSA contains an angiosperm site and is in proximity to the Fruita Paleontological Site which contains stratigraphic units. Potential is high for significant fossils within the Morrison outcrops in both Black Ridge Canyons WSAs.

Excavation of dinosaur fossils has occurred within the Morrison Formation in the Dominguez Canyon WSA. Potential still exists for other finds, including fossils that could be similar to those found in the Fruita Paleontological Site.

Most of the formations within the Sewemup WSA have a low potential for paleontological values. However, the Moenkopi formation (which outcrops along the flanks of the WSA within Sinbad Valley) has produced amphibian and dinosaur tracks near Gateway.

Issue Resources Common to WSAs

The Moenkopi formation also outcrops in The Palisade WSA, but the slopes are too steep to be effectively surveyed.

The Mesa Verde Group geologic formations occur within the Demaree Canyon and Little Book Cliffs WSAs and has produced isolated finds of dinosaur footprints and plant fossils. In this area, however, the possibility of finding significant fossils is moderate to low because of the steep outcrops associated with these formations.

LIVESTOCK GRAZING

Section 4(d)(4)(2) of the Wilderness Act provides for continued livestock grazing where established prior to designating an area as wilderness. Grazing occurs in all WSAs except on the top of Sewemup Mesa and on 18,000 acres of the Little Book Cliffs WSA which is reserved for 65-120 wild horses.

A U.S. Congress report on grazing in wilderness areas (House Report 96-1126) stated that "there shall be no curtailment of grazing permits or privileges in an area simply because it is wilderness." Several issues have developed over grazing administration and they include maintenance of existing range projects, construction of new projects, and the use of motorized vehicles and mechanical equipment in designated wilderness.

CULTURAL RESOURCES

Cultural resource Class I, II and III inventories, although partial, indicate that historic and prehistoric cultural resources occur throughout the 241,005 acres of the seven WSAs. Forty-three cultural resource sites that are eligible for the National Register, representing a variety of prehistoric and historic activities, have been documented in the seven WSAs.

LOCAL SOCIAL AND ECONOMIC CONDITIONS

The seven WSAs are all predominantly located in or accessed through Mesa County. Although wilderness determination may have some slight effect on surrounding counties, only Mesa County is likely to have measurable social and economic impacts. As the longstanding communication, transportation and service center for western Colorado and eastern Utah, the county is the most populous in the region and will probably remain so. Population growth was

rapid throughout the 1970s, peaking in 1982 at about 93,000 residents. The decline of the regional energy fuels industry has reversed that growth and the current population is closer to the 1980 census estimate of 81,530.

The economy is dominated by the retail trade, service, and government sectors but has substantial mining, manufacturing and construction sector activity. To some extent, the size of the trade and service sectors is attributable to Grand Junction's location, which is central to much of the region's recreation and tourist destinations. Future economic growth will depend on a resurgence of the energy fuels industry and the ability to attract new industrial activity. A more detailed description of the local economy is included in Chapter 3, Social and Economic Conditions of the RMP/EIS.

Although Mesa County would be the site of most of the social and economic impacts from wilderness designation, the population that would use designated wilderness areas would come from a much larger area. Local use, which is drawn from a population within 2 hours' driving time of any of the WSAs, would include over 200,000 in eleven Colorado counties and two Utah counties. Regional use, which is drawn from the population within a five hours' drive from any one of the WSAs, would be much greater. There are seven Standard Metropolitan Statistical Areas (SMSAs) in the Colorado Front Range, representing two and one-half million people, that are within five hours. Two SMSAs in Utah's Wasatch Front add another one and one-third million to the regional population. The growth rates of most of the SMSAs are very high, over two and one-half percent annually, and are expected to remain high for the rest of the century.

Very little economic activity occurs within the seven WSAs. What does occur is summarized as follows:

Minerals: While some of the WSAs—Sewemup Mesa, The Palisade, and Dominguez Canyon—have been the site of sporadic exploration for locatable minerals, their potential is rated low and no production of locatable minerals currently takes place. Two of the WSAs—Demaree Canyon and Little Book Cliffs—are entirely within the Grand Junction Resource Area's potential coal development area. No production occurs at present, but 222 acres of Demaree and 1,934 acres of Little Book Cliffs are held by pre-FLPMA coal leases whose lease boundaries extend outside the WSAs.

Livestock Grazing: Grazing is currently permitted on at least part of each WSA. The top of Sewemup Mesa (12,000 of the areas' 19,140 acres) and the wild horse portion of the Little Book Cliffs (18,000 of the areas' 26,525 acres) are closed to

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grazing. The estimated 11,942 AUMs provided from the WSAs represent about \$315,000 in gross revenue and about \$18,000 in federal grazing fees. The Wilderness Act specifically provides for continuation of grazing in areas designated wilderness.

Forestry: Pinyon-juniper woodlands exist in all the WSAs, and some areas have been identified as potentially suitable for management and harvest. Unauthorized fuelwood gathering in some of the WSAs reflects the high local demand for woodland products.

Recreation: Recreation use of the WSAs is generally low because of limited physical access. Current land based recreation use is estimated at about 14,000 visitor days per year, primarily for hiking and deer hunting. Since most of the use is local, its economic impact is lessened, but non-local use, some of it commercial hunting trips guided by local outfitters, may contribute up to \$500,000 annually in local economic activity. The Colorado River through Horsethief and Ruby Canyons is part of the Black Ridge Canyons and Black Ridge Canyons West WSAs. Even if not included as part of a wilderness area, wilderness designation would affect its recreational use level. Currently, about 9,000 visitor days of water-based recreation use takes place in Ruby Canyon each year of which about 4,000 involve commercial river outfitters. Total local business activity of perhaps \$250,000 is generated by this use. The newly instituted river permit system generates several thousand dollars per year in federal revenue.

OTHER ISSUES COMMON TO WSAs

WILDERNESS CONSISTENCY WITH OTHER PLANS

Wilderness designation is generally consistent with or not addressed by local plans. The major disagreement is with the *West Central Colorado Coal Environmental Statement* which identifies areas to be developed for coal in Demaree Canyon and the Little Book Cliffs WSAs. Grazing management in any WSAs designated wilderness will be in accordance with the *Grand Junction Resource Area Grazing Management Final Environmental Impact Statement* and subsequent decisions.

WILDERNESS SUPPLY

The seven WSAs located in the Grand Junction Resource Area all fall into the ecological category called the Colorado Plateau Province (Kuchler 1975). It is further divided into a section labeled The Juniper-Pinyon Woodland and Sagebrush-Saltbush Mosaic. This province has tablelands of moderate to considerable relief. Elevations range from 5,000 to 8,000 feet. Local relief is from 500 to more than 3,000 feet in some of the deeper canyons.

The lowest part of the province is covered by grasslands. Xeric shrubs often grow in open stands among the grasses. Sagebrush is dominant over extensive areas. A profusion of annuals and perennials bloom during the summer rainy season. At low elevations, cacti and yucca are common. Cottonwood and other riparian vegetation grow along the water courses. The montane zone of the province is dominated by pinyon pine and juniper.

It is within this ecological unit reference that the WSAs in the Grand Junction Resource Area are analyzed together with the designated wilderness and other wilderness study areas also in this unit.

Table I-4 summarizes the existing wilderness resources within the Colorado Plateau Province. This has been adjusted to exclude those areas outside the 5-hour driving range of the major metropolitan areas of Provo and Salt Lake City, Utah; and Denver. The importance of these metropolitan areas is discussed under the next section.

Table I-4. Summary of Wilderness Supply, Colorado Plateau Province

State/Agency	Existing Wilderness (Acres)	Areas Proposed or Under Study
Colorado (west central and SW):		
National Park Service.....	8,100	13,842
Bureau of Land Management	0	360,420
Utah (east central and southern):		
National Park Service.....	0	1,273,592
Bureau of Land Management	0	2,374,601

NOTE: There are no Colorado Plateau ecotypes represented by U.S. Forest Service or U.S. Fish and Wildlife Service areas in Colorado or Utah. It should also be noted that the Mesa Verde Wilderness is closed to the public due to the protection of cultural values.

Issue Resources Specific to WSAs

PROXIMITY TO MAJOR POPULATION CENTERS

The House report on the *Endangered American Wilderness Act* of 1978 states that one of the goals of Congress is "... locating wilderness areas in close proximity to population centers." To help meet this goal, the wilderness study policy dictates an analysis of the number of population centers within a day's drive (5 hours) of a study area in order "to acquire a relative measure of the potential demand being placed on wilderness areas." These population centers are defined as standard metropolitan statistical areas (SMSAs). An SMSA is defined by the U.S. Bureau of the Census as a county containing at least one city of 50,000 inhabitants or more plus as many adjacent counties as are metropolitan in character and are socially integrated with that central city or cities, the entire area having at least 100,000 inhabitants. SMSAs within 5 hours drive of the Grand Junction Resource Area are shown in Table I-5 along with the Grand Junction metropolitan area. Although it is presently not large enough to qualify as an SMSA, Grand Junction and its surrounding area have a significant population. The 1980 census shows a population of 67,894 for the Grand Junction and Clifton Census Divisions of Mesa County (Colorado Division of Planning 1980). The population of the Grand Junction area is projected to increase to 250,000 in the next 25 years.

ISSUE RESOURCES SPECIFIC TO WSAS

DEMAREE CANYON WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. The WSA contains 21,050 acres of public land administered by BLM. This WSA has a blocked configuration with two cherry-stems on the north side (Fig. I-3).

Naturalness. The Demaree Canyon WSA offers a highly dissected topography. The dominate feature is a series of steep-sloping canyons running generally in a north-south direction. The Book Cliffs provide an abrupt break along the southern boundary of the unit. Vegetation is scattered pinyon-juniper and dense mountain brush on the higher elevations and sagebrush and saltbrush in the lower elevations.

Minor imprints of man found in the unit include two well-screened fencelines, evidence of past coal mining activity, some ways, and small stock reservoirs. These imprints are scattered throughout the unit and are screened with vegetation, which makes them substantially unnoticeable. The area appears to be affected primarily by the forces of nature.

Interim management activities to date include two gas wells that have been drilled in this unit.

Outstanding Solitude. Due to the highly dissected topography caused by the series of canyons and ridges and due to ample topographic screening, outstanding opportunities for solitude are present. The large size and blocked configuration of the unit also enhance the opportunities to be isolated from others while in the unit.

Outstanding Primitive and Unconfined Recreation. Outstanding opportunities for primitive recreation are not found within the unit. Hunting is the primary recreational opportunity in the unit. It is estimated that 50 visitor days of primitive recreation use occur in this unit. This includes hiking, most of which has been associated with the fact that this area is under wilderness review and the public is trying to become familiar with the unit.

Special Features. There are no special features in this WSA but it is one of only two WSAs within the Book Cliffs in Colorado being studied for wilderness.

Coal

The WSA contains 222 acres of pre-FLPMA coal leases in the northeast corner (Fig. I-4). The cherry-stemmed roads in the north central part of the WSA provided access to drilling coal core sites, products of on-going coal exploration. An abandoned surface coal mine and rehabilitated road are located in Demaree Canyon.

The WSA lies within the Book Cliffs potential coal development area. BLM estimates there are 277 million short tons of in-place coal within the WSA.

Under the Maximum Wilderness Alternative, the northeast boundary is expanded to include a total of 2,080 acres of coal leases (includes 222 acres inside WSA boundaries).

Oil and Gas

The WSA is completely leased for oil and gas.. There are 43 pre-FLPMA leases (19,300 acres, 92 percent of WSA) with valid existing rights and 7 post-FLPMA leases (1750 acres, 8 percent of

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Table I-5. Standard Metropolitan Statistical Areas within Five Hours Drive of the Grand Junction Resource Area

Area	County	Population	Distance
Colorado: Denver/Boulder.....	Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson.	1,620,902	5 hours
Utah: Salt Lake/Ogden	Davis, Salt Lake, Tooele, Weber ..	936,255	5 hours
Provo/Orem.....	Utah.....	216,106	4 hours

Note: These are major population centers. Denver and Salt Lake City are both standard metropolitan statistical areas.

WSA) (Fig. I-4). The WSA is surrounded by known geologic structures of producing oil and gas fields. The Garmesa Field enters the northeast boundary of the unit. A USGS study of petroleum resources of potential wilderness lands rated this WSA as an area of high oil and gas development potential. Two wells have been drilled in the WSA. One has been plugged and abandoned and the other is producible.

Recreation

The primary recreational opportunity spectrum (ROS) class found in this WSA is semi-primitive non-motorized (SPNM). There is also a half mile band of semi-primitive motorized (SPM) that parallels the Petro-Lewis Road along the northeastern side of the WSA. Appendix H explains the six ROS settings and their related experience opportunities and activity opportunities. Simply stated the ROS provides a framework for stratifying and defining classes of outdoor recreation opportunity settings. These settings range from easily accessible, highly developed areas with modern conveniences to undeveloped primitive areas in remote locations.

Minimal recreational use presently take place in the unit. See earlier discussion in the section labeled Primitive Recreation Opportunities. The area is open to off-road vehicles but no use occurs due to the lack of roads.

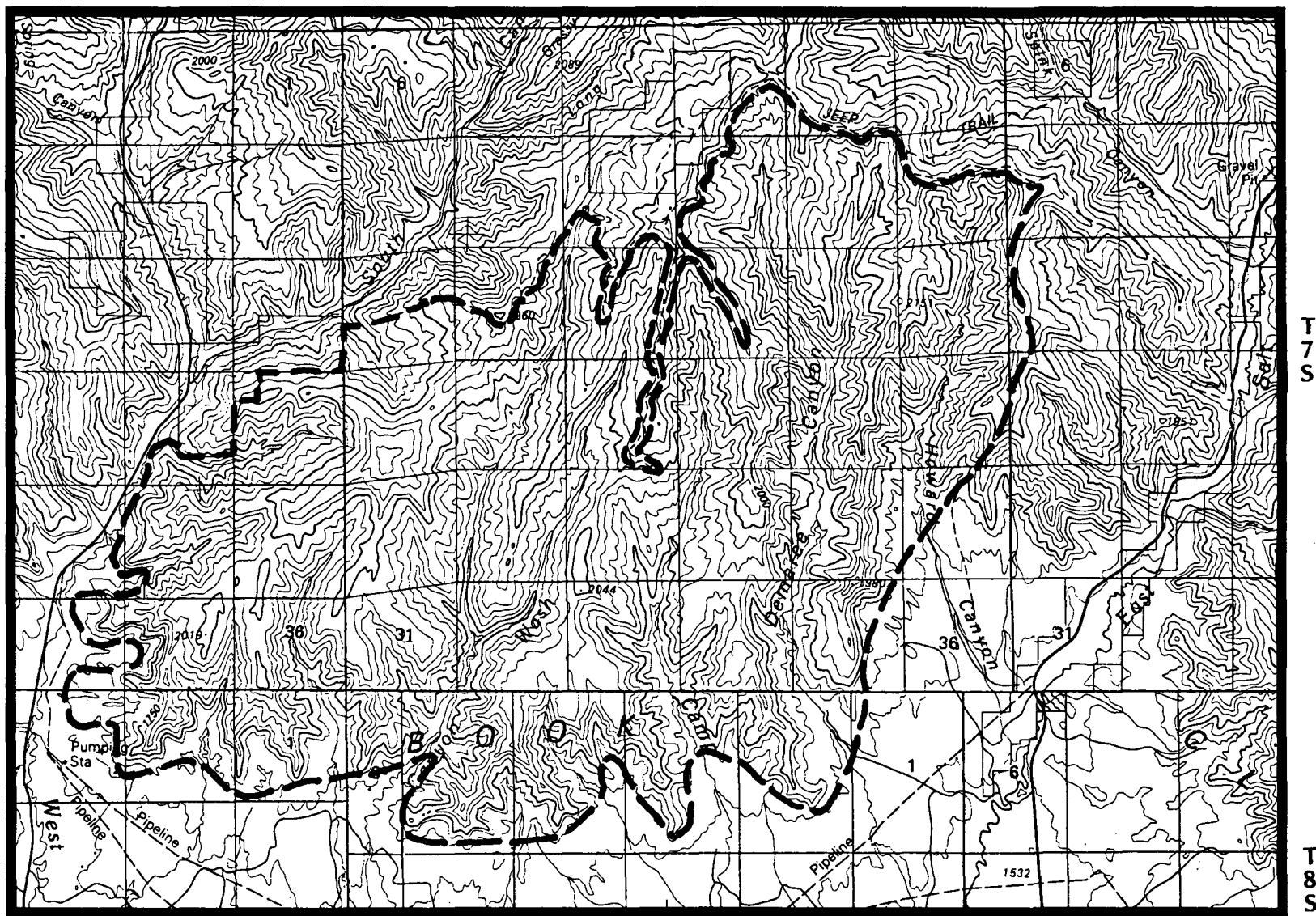
Visual Resources

All of the WSA is in a visual resource management Class IV except for the face of the Book Cliffs

which is Class II (eastern half) and Class III (western half and along West Salt Creek) (Fig. I-5). The Glossary defines each visual resource management class. These classes were derived based on scenic quality, visual sensitivity and distance from the viewer. The face of the Book Cliffs are considered A or outstanding scenery.

Utility Rights-of-Way

A major pipeline utility corridor parallels the western edge of the WSA. Five 50-foot wide gas pipeline rights-of-way are in this corridor: Mapco (NM-36230), Rocky Mountain Natural Gas (C-21963), Wesco (C-012469), and two Western Slope Gas lines (C-029008, C-029366). Also, a proposal has been made by Northwest Pipeline Corporation to build in this corridor. The pipelines constructed in this corridor have been separated both horizontally and vertically but saturation of the corridor may have been reached in terms of engineering and safety. This would require future construction inside the WSA or along the west side of 60-foot wide county road. Construction on the west side of the county road would require major side hill cuts. The major conflict occurs in a mile and one-half long area characterized by narrow, steep terrain from the center of Sec. 23 to the southeast corner of Sec. 27, T. 7 S., R. 104 W., 6th P.M.



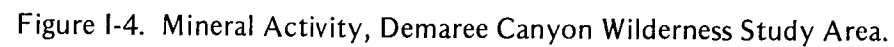
LEGEND

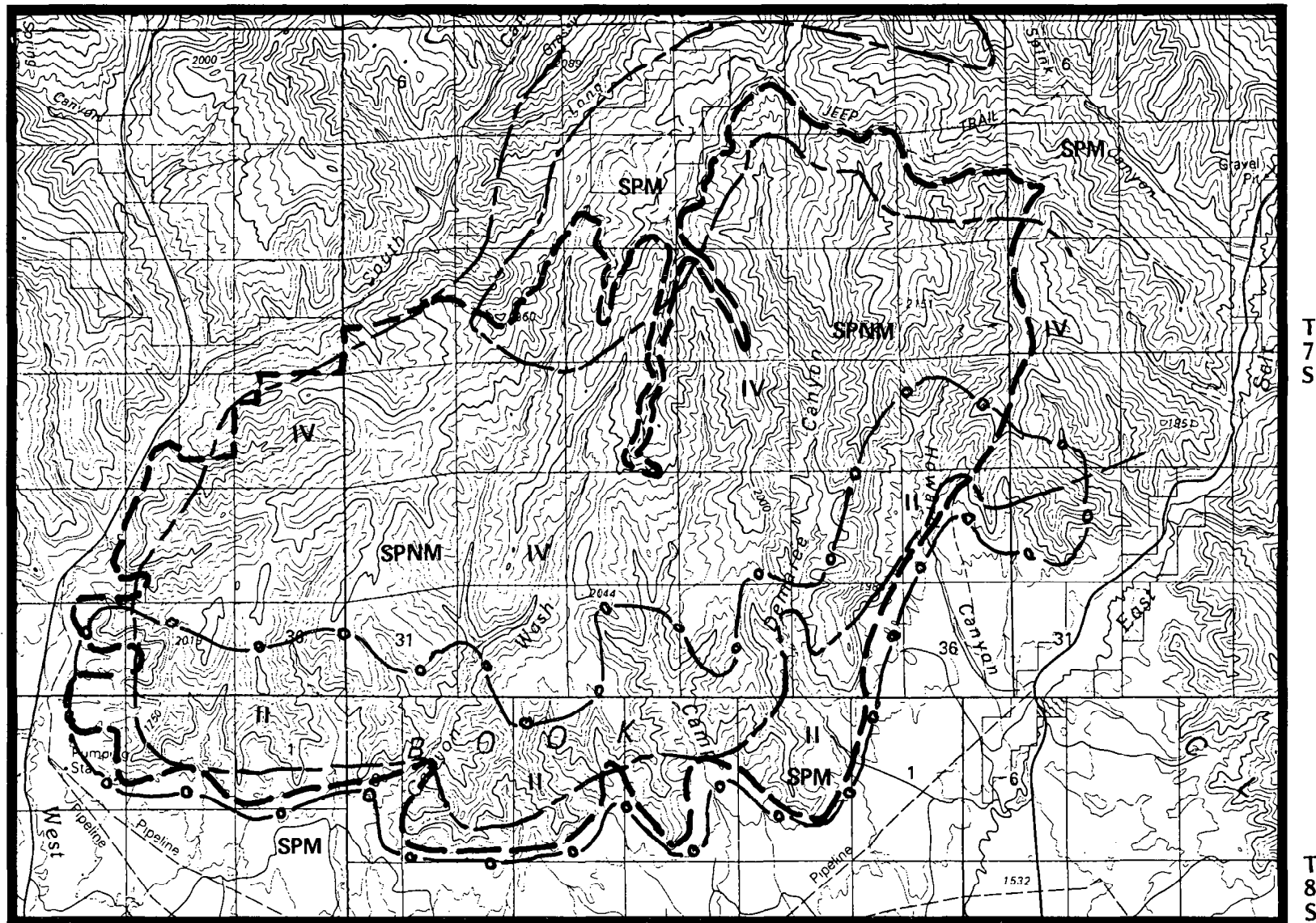
--- WSA Boundary

1 1/2 0 1 2 3 Miles



Figure I-3. Demaree Canyon Wilderness Study Area.





LEGEND

- WSA Boundary
- Recreation Opportunity Spectrum Settings (P, SPNM, SPM, RN)
- Visual Resource Management (II, III, IV)

1 1/2 0 1 2 3 Miles



Figure I-5. Recreation and Visual Resources Demaree Canyon Wilderness Study Area.

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LITTLE BOOK CLIFFS WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. The WSA contains 26,525 acres of public land administered by BLM. It is generally oblong in shape and well blocked except for a large chained area that was excluded from the northern half of the unit. One cherry-stem road enters the unit from the west (Fig. I-6).

Naturalness. Part of the southern edge of the unit is dominated by the 2,000-foot high face of the Book Cliffs. The area to the north of the cliff face is a gently upward sloping plateau region that is highly dissected by four major canyon systems. The canyons are generally characterized by steep cliff walls on both sides that are up to 1,000 feet high in places. Vegetation in the canyons consists primarily of big sagebrush, rabbitbrush, and fourwinged saltbrush. Pinyon-juniper woodlands dominate most of the upland area which is located between the canyon systems.

The canyon systems contain only two imprints of man. There is a way in Main Canyon and several short sections of fence in Main Canyon. Due to the lack of any construction or maintenance, in conjunction with good revegetation, this way has a minimal amount of impact on the naturalness. Also, several ways, a corral, and a fenceline occur on the upland areas of the unit. All of these ways are unconstructed, unmaintained, parallel tire tracks. The corral is made of wood posts and is well hidden amongst the pinyon-juniper woodlands.

Under interim wilderness management, two wells have been drilled in the unit and shut-in and three others have been drilled and are producible. Currently, there are eight pending applications for permit to drill within the WSA.

Outstanding Solitude. Outstanding opportunities for solitude exist within the Little Book Cliffs WSA. The large number of canyons within the unit provide recreationists many opportunities to disperse. The gently twisting configuration of the canyons limits the views within the canyons, increasing feeling of solitude. The rolling topography of the upland areas of the unit provides for outstanding opportunities for solitude because of its effective screening. The upland topography is easily travelled which would allow for easy dispersion of visitors. In addition, the dense pinyon-juniper woodlands in the higher part of the unit effectively screens people.

Outstanding Primitive and Unconfined Recreation. Outstanding opportunities for several different types of primitive recreation exist within the Little Book Cliffs WSA. The unit's size, topographic

diversity, scenic beauty, the presence of a wild horse herd, and numerous different canyon systems all work to create outstanding opportunities for horseback riding, hiking, backpacking, photography, scenic viewing, and the viewing of wild horses. The outstanding scenic beauty in conjunction with the presence of the wild horse herd offers outstanding opportunities for photography and wild horse observation while participating in hiking. Backpacking opportunities are outstanding as a result of the large number of traversable canyon systems. The ruggedness of the unit provides the backpacker with a high degree of challenge.

Special Features. Several special features exist in the unit, the predominant one being the presence of 65-120 wild horses. Cultural values of the Fremont Culture and several natural bridges and hoodoos (mushroom shaped rocks) are found here. The unit is in close proximity to Grand Junction, Colorado.

Coal

The WSA lies within the Book Cliffs potential coal development area. BLM estimates there are 349 million short tons of in-place coal within this WSA.

This WSA includes 1,934 acres in two pre-FLPMA coal leases which are located primarily along Coal Canyon (Fig. I-7). Coal exploration holes and trails from one lease were excluded from the WSA on its southern boundary because of impacts on naturalness. There is no surface disturbance on the leases within the WSA. Historically, coal mining has occurred all along the Book Cliffs within a mile of the WSA's southern boundary. Ongoing mining is taking place at the Powderhorn Mine near the eastern edge of the unit.

Oil and Gas

The entire WSA is leased for oil and gas. There are 53 pre-FLPMA leases (22,645 acres, 85 percent of WSA) with valid existing rights and 7 post-FLPMA leases (3,880 acres, 15 percent of WSA) (Fig. I-7).

Known geologic structures (KGSs) of producing oil and gas fields surround the WSA except on its south side. One KGS includes several thousand acres of the WSA on its north side. The Cameo Field on the east side also extends into the WSA. A USGS study of petroleum resources on lands under wilderness review rated this WSA as an area of high oil and gas potential. Five wells have been drilled in the WSA. Two wells were subsequently plugged and abandoned and three are producible.

Issue Resources Specific to WSAs

There are eight pending applications for permit to drill on pre-FLPMA leases in the WSA.

Wild Horses

About two-thirds of the 27,881-acre Little Book Cliffs Wild Horse Range is located within the 26,525 acre Little Book Cliffs WSA. The horses are considered a special feature of the WSA and enhance its primitive recreation opportunities. The range, which is home for 65-120 horses, was established in 1974 but was not officially dedicated until 1980. It is one of three designated wild horse ranges in the United States. Primary management objectives of the wild horse range include maintaining the natural character of the area, providing quality wild horse and wildlife habitat, and providing for the recreational use of the area, especially the viewing of horses.

Recreation

The primary recreation opportunity spectrum setting in this WSA is semi-primitive non-motorized (see Appendix H). Some semi-primitive motorized recreational (20 percent of area) opportunities exists along the western and northern boundaries.

This WSA is popular for hiking, backpacking, and viewing wild horses. Some motorized use takes place in Coal and Main Canyons. Primitive recreation is estimated to be 1,500 visitor days. A large part of this use is related to viewing and photographing wild horses. Motorized use is estimated at

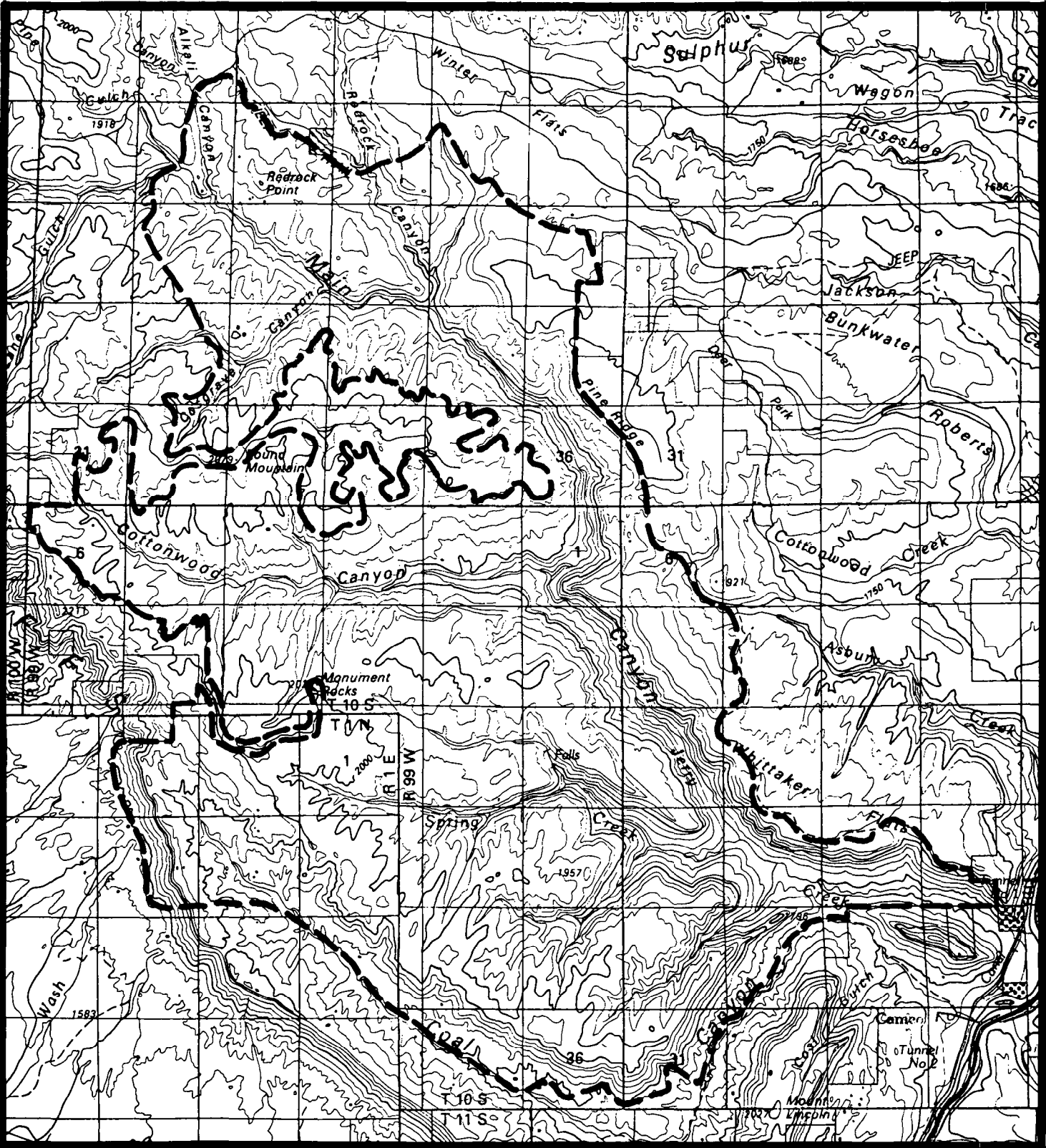
about 7,000 visitor days per year primarily on roads in Coal Canyon, the boundary road of the WSA. About 1,000 visitor days per year of small game hunting also occur in Coal Canyon. See also primitive recreation opportunities in this section.

Visual Resources

All of the WSA is in visual resource management Class II (Fig. I-8) which provides for retaining the existing character of the landscape by having minimal surface disturbance (see Glossary). About 2 miles of the Little Book Cliffs WSA's escarpment is visible from the Grand Valley and has outstanding scenic quality (Class A) and a high degree of visual sensitivity to any changes.

Utility Rights-of-Way

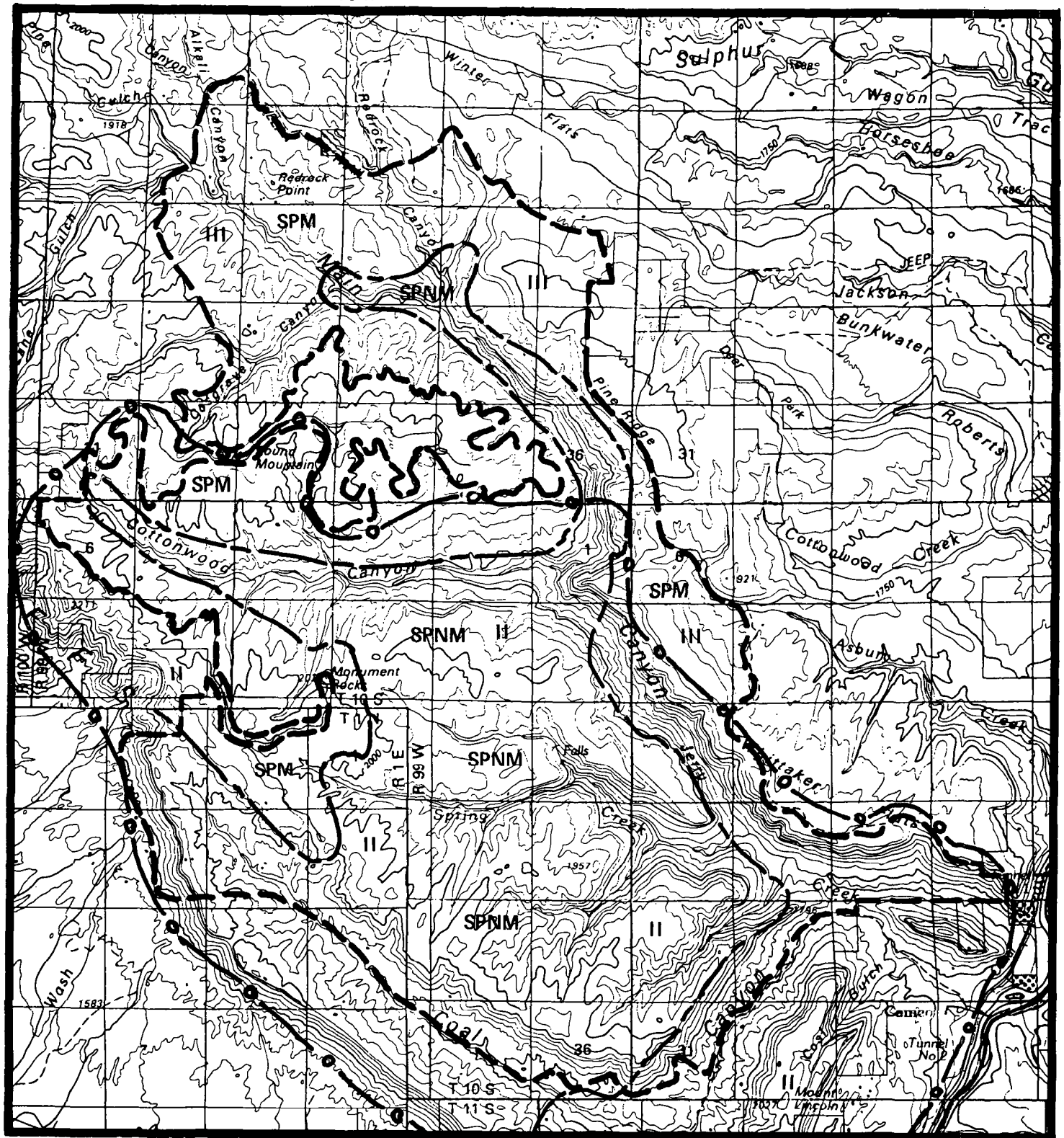
Public Service's 69 kilovolt line from the Cameo station currently forms part of the eastern boundary of the WSA. An upgrading of this line from 69 kilovolts to 230 kilovolts would follow almost the entire WSA boundary in Coal Canyon. It would be anticipated that future power lines might be needed along an east-west alignment through Coal Canyon or elsewhere in this WSA. If privately-owned oil shale resources are developed on a large scale, the WSA area may be evaluated for a pipeline and power line corridor due to its central location between oil shale projects and the Grand Valley. Gas development in the WSA would also require gathering system pipelines.



LEGEND

--- WSA Boundary

Figure I-7. Mineral Activity, Little Book Cliffs Wilderness Study Area.



LEGEND

- WSA Boundary
- - - Recreation Opportunity Spectrum Settings (P, SPM, SPNM, RN)
- Visual Resource Management (II, III, IV)
- ▣ Bureau of Reclamation

Figure I-8. Recreation and Visual Resources, Little Book Cliffs Wilderness Study Area.

Issue Resources Specific to WSAs

BLACK RIDGE CANYONS WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. The WSA contains 18,150 acres of public land administered by BLM. The WSA is generally oblong in shape and has three cherry-stemmed roads (Fig. I-9).

The Black Ridge Canyons unit consists of a high ridge on the southern side of the area, off of which six major canyons drain. These canyons drain in a northerly direction toward the Colorado River, which forms the northern boundary of the unit. Sloping mesas which have a rolling, hillock type of topography occur in between each of the canyons. The vegetation of the unit consists of an open pinyon-juniper woodland with occasional clearings composed of sagebrush and various species of grass. Vegetation within the canyons consists of scattered pinyon-juniper woodlands in the broad, open areas; grassy meadows in the bottoms; and various riparian species such as willow and cottonwood.

Imprints of Man. Imprints of man found within the unit include five stock reservoirs, several fence-lines, a corral, two tarpaper shacks, and three ways. The stock reservoirs and fence-lines are generally scattered on the mesa top along the western and southern boundaries. Two one-fourth mile ways, consisting of two tracks, also enter this southern boundary. One way, approximately three-fourths of a mile long, enters the unit on the ridge above the mouth of Flume Creek Canyon. The tarpaper shacks are located at the heads of Devil's Canyon and the West Fork of Pollack Canyon.

There have been no interim management activities in this WSA.

Outstanding Solitude. Overall, the Black Ridge Canyons unit provides outstanding opportunities for solitude. The large number of canyon systems within the unit serve to horizontally disperse people throughout the unit without concentrating large number of people into certain preferred areas. Side canyons and amphitheaters allow people the opportunity to isolate themselves from the main parts of the canyons. Opportunities for solitude within a single canyon is further accentuated by vertical isolation due to benches at various levels. The relatively open expanses on the mesa tops additionally offer outstanding solitude in that people can become widely separated on a horizontal basis due to topographic and vegetative screening. Additionally, the unit's large size and broad configuration greatly increases the probability of people being able to isolate themselves from one another.

Outstanding Primitive and Unconfined Recreation. Outstanding opportunities for primitive recreation are found in the unit. Topographic diversity; unusual landforms such as arches, spires, and windows; and intermittent waterways all provide high appeal to hikers. Outstanding opportunities for day hiking are further accentuated by the presence of many unique geologic features. The thirteen known natural arches in the unit have an appeal to the day hiker as well as the backpacker. Opportunities for floatboating down the Colorado River are excellent. Many people float the river for the purposes of gaining access into the canyons, fishing, picnicking, camping and general scenic viewing. Several other types of primitive recreation which also occur within the unit include horseback riding, deer hunting, fishing, bird watching, scenic viewing and the study of archaeological and paleontological values.

Special Features. The Black Ridge Canyons unit contains several significant special features. Approximately 84,000 people live in the Grand Valley within an hour's drive of the area. A rare butterfly, the *Papilio indra minori* is known to inhabit the area. Four endangered fish species are found in the section of the Colorado River located within the unit. Active golden eagle nesting sites exist within the area. This portion of the Colorado River has been recommended for scenic designation under the Wild and Scenic Rivers Act. Thirteen known natural arches are located in the unit. Evidence of habitation by the Desert Archaic, Fremont, and Ute Indian cultures occur throughout the area. The area also contains significant paleontological resources.

Wildlife

The pinyon-juniper woodland, sagebrush and riparian vegetation types in this WSA provide for a variety of wildlife including deer, mountain lion, big horn sheep, and bald and golden eagles. See Chapter 3 of the resource management plan text for a complete wildlife listing. The general wildlife habitat condition is static to improving in this WSA. Riparian habitat along the Colorado River on the northern edge of the unit is declining.

The nucleus of a future herd of bighorn sheep have been introduced into this unit. Presently, there are between 30 and 40 animals in the Black Ridge Canyons group. These animals range into the adjacent Black Ridge Canyons West WSA.

The WSA is underutilized by wildlife due to long distances from water. Opportunities exist to develop water catchment devices and to improve forage production through prescribed fire or brush-beating followed by reseeding.

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Recreation

Presently, this unit and the adjacent Black Ridge Canyons West unit are managed as recreation lands to protect recreational values. Recreation opportunity spectrum (ROS) settings are shown in Figure I-10. The dominant setting is semi-primitive non-motorized.

The primary activity in the unit is hiking associated with viewing of the arches in Rattlesnake Canyon. Access to the arches is by 4-wheel drive road via the Black Ridge hunter access road or by hiking the Ute Trail. The Ute Trail, on the northeast corner of the unit, does not have continuous legal access. Hiking also occurs in Pollock, Flume and Devil's Canyon. Floatboating use occurs in Ruby Canyon, of which approximately two miles of the canyon is in the WSA. Overall, about 6,000 visitor days of use occurs in the WSA.

Off-Road Vehicle (ORV)

Currently, off-road vehicle use in this unit is limited to existing roads and trails. One and one-half miles of a 4-wheel drive trail was closed to off-road vehicle use in the summer 1984 due to ORV impacts to the naturalness of the ridge above Rattlesnake Canyon arches.

Off-road vehicle use adjacent to Flume Canyon is currently impacting the naturalness of the WSA and may require an emergency closure in the future.

Overall, about 3,000 visitor days per year in this unit are related to ORV use on existing roads. The major part of this use is by recreationists using 4-wheel drive vehicles and motorcycles to gain access to Rattlesnake Canyon. See Black Ridge Canyons West discussion on the Colorado Ridge Road, which forms the boundary between the two Black Ridge Canyons WSAs.

Transportation

The Black Ridge hunter access road, which forms a portion of the southern boundary of the

WSA, was a cooperative effort between the Colorado Division of Wildlife and BLM to provide motorized, legal access into the Black Ridge area for hunting purposes (Fig. I-10). Off-road vehicle use from this road continues onto several north-south grazing administration roads. These roads were excluded from the WSA during the wilderness inventory. Use of these roads is discussed under recreation in this section.

The WSA has good public access from the road system (Fig. I-10). Legal access is unavailable for hiking into the mouth of Devil's, Flume or Pollock Canyons. Legal access is also unavailable for hiking to the Rattlesnake Canyon arches via the Ute Trail. Access can also be obtained to the northern boundary by floating the Colorado River. A major problem with the Black Ridge hunter access road lies in the fact that wet or snowy weather makes it impassable. Due to soil characteristics and because a major part of it is on a north aspect, it does not dry quickly.

Utility Rights-of-Way

Currently a single pole power line forms the eastern boundary of the unit. The power line originates from the Redlands area, north of the Colorado National Monument and services various communication facilities on Black Ridge.

Currently, several miles of the Fruita water line cross Colorado National Monument. The line historically has carried water from the Fruita Water Reserve (Grand Mesa National Forest) on Glade Park to Fruita. The National Park Service is concerned about the surface disturbance created by maintenance of this line. In the future a small utility corridor may be needed to serve Glade Park, and no north-south corridor is available between Colorado National Monument and Westwater, Utah.

Issue Resources Specific to WSAs

BLACK RIDGE CANYONS WEST WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. The WSA contains 54,290 acres of public land administered by BLM. The WSA is generally a rectangular shape and has one cherry-stemmed road.

Naturalness. The Black Ridge Canyons West unit is located on the northwest sloping edge of the Uncompahgre Plateau. The unit consists of a series of deep canyon systems which dissect the plateau. Vegetation within the canyon consists of pinyon-juniper woodlands, grassy meadows, and riparian vegetation in the more moist areas. The mesas are relatively flat with small drainage channels occurring throughout. Vegetation on the mesas is dominated by pinyon-juniper woodlands and occasional sagebrush parks.

No imprints of man occur within the canyon systems of the area. Several ways, some stock reservoirs, and a few fence lines are located on the mesa tops, all of which are considered to have a minimal impact on the naturalness of the unit due to vegetative and topographic screening. The unit is essentially natural in character and is affected primarily by the forces of nature.

Interim management activities include several range projects which have been approved in the unit. These include two sandstone reservoirs, a water pipeline, and a solar well. None of these have more than a minimal impact on the unit's naturalness.

Outstanding Solitude. Overall, the Black Ridge Canyons West unit provides outstanding opportunities for solitude. The large number of canyon systems within the unit serve to horizontally disperse people throughout the unit without concentrating large numbers of people into certain preferred areas. Large side canyons and amphitheaters allow people the opportunity to isolate themselves from the main canyons. Opportunities for solitude within the canyon systems, such as Mee or Knowle's Canyons, are further accentuated by vertical isolation due to benches at various levels within a single canyon. The relatively open expanses on the mesa tops additionally offer outstanding solitude in that people can become widely separated on a horizontal basis due to topographic and vegetative screening. Finally, the unit's large size and broad configuration greatly increases the probability of people being able to isolate themselves from one another.

Noise from the Denver and Rio Grande trains, whose tracks enter Ruby Canyon from Salt Creek and continue west along the Colorado River, does

permeate the unit. However, this intermittent noise primarily impacts visitors along the river but has minimal impact to recreationists in the remainder of the unit because of the muffling effect of the intervening topography.

Outstanding Primitive and Unconfined Recreation. Outstanding opportunities for primitive and unconfined recreation exist in the Black Ridge Canyons West unit due to outstanding scenery and landscape variety, interesting geologic features, three major canyons, the Colorado River, and cultural and paleontological resources. These outstanding opportunities include backpacking, hiking, scenic viewing, photography, and horseback riding. Opportunities for floatboating down the Colorado River are also outstanding with access readily available from the Grand Junction area. Fishing, camping, and picnicking are also enhanced by the river. The variety of wildlife, including big game, offers the opportunity for hunting and wildlife photography.

Special Features. Several special features can be found in the unit. These features include its close proximity to Grand Junction, the presence of several endangered species of wildlife and fish, geologic features, and cultural values. Several species of fish and a rare butterfly, *Papilio indra minor*, also inhabit the area. A portion of the Colorado River within the unit is presently being considered for inclusion in the Wild and Scenic Rivers System. Numerous natural arches are located in the unit. Evidence indicates the area has a rich prehistory.

Forestry

The unit contains 7,435 acres of productive pinyon-juniper woodlands stands. The stands are characterized by 40 percent crown cover and occur on slopes of less than 35 percent (Fig. 1-11).

Fifty to 75 percent of the stands are physically accessible. They would yield about 6 cords per acre. Productivity of the stands is considered low due to of low rainfall, low elevation, and shallow soils.

Wildlife

Wildlife habitat and major species of this unit are described in the Black Ridge Canyons WSA.

Recreation

Presently this WSA and the adjacent Black Ridge Canyons unit are managed as recreational lands to protect recreation values. Recreation opportunity

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spectrum settings are shown in Figure I-10. Because of the extensive canyon systems, the dominant recreation opportunity spectrum classes are semi-primitive non-motorized and primitive.

The area is primarily used for hiking in Mee, Knowle's and Jones Canyons and on the bench lands above the canyons. A limited amount of ORV use occurs on the Colorado Ridge road, the Knowle's Canyon Bench road and trails in the unit (Fig. I-10). Total use is estimated to be about 1,500 visitor days. This does not include floatboating use and associated shoreline camping on the northern edge of the WSA which involved about 7,000 visitor days of use per year.

The Colorado Ridge road separating the two Black Ridge units and the bench road between Mee and Knowle's Canyon have been excluded from the WSA. These roads provide for grazing administration and a limited amount of 4-wheel drive use (estimated to be about 300 visitor days). Historically, these roads were used for deer hunting and grazing administration. But, due to the decline of the deer population, minimal hunting takes place in the unit; and the roads are mainly used for grazing administration and recreational purposes.

Off-Road Vehicles (ORV)

Off-road vehicle use continues west from the Black Ridge hunter access road by following a 4-wheel drive road that loops around the head of

Mee Canyon and connects to the ridge road between Mee and Knowle's Canyons (Fig. I-10). This road is used by a limited number of off-road vehicle enthusiasts.

The road at the head of Knowle's Canyon along the south boundary of the WSA is very rough and used very little.

Off-road vehicles using ways around Jones Canyon generally obtain access to the WSA from Glade Park on BS Road. Many of the ways shown on the map are revegetating and continued ORV use creates a management problem.

Also, see Off-Road Vehicles section for Black Ridge Canyons WSA.

Transportation

This WSA has good public access. The Black Ridge hunter access road provides access to Mee and Knowle's Canyons while Mesa County BS Road provides access to Jones Canyon and the western part of the unit. Floatboaters on the Colorado River are afforded access to the northern boundary and the mouths of all the major canyons.

The Colorado Ridge Road (Fig. I-10) forms the division between the two Black Ridge units. The road divides about three miles from the Colorado River and provides access to two private parcels of land. The recreationists that do make it this far have to trespass on private property to get to the Colorado River .

Issue Resources Specific to WSAs

THE PALISADE WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. This WSA contains 26,050 acres of public land administered by BLM. The WSA is triangular in shape and well blocked. Two cherry-stemmed roads enter the west side (Fig. I-12).

Naturalness. The unit is characterized by vertical cliffs, deep rugged canyons, and rolling to flat desert valley bottoms dissected by gulches. The higher elevations consist of open, sloping to flat grasslands and meadows with moderate to heavy stands of intermixed pinyon, juniper, and oak brush. The upper drainages contain some aspen and ponderosa pine, and some riparian vegetation exists along the North Fork of West Creek. The lower elevations consist mainly of pinyon-juniper and desert shrub type vegetation.

The imprints of man that exist within the unit are either of a minor nature, well screened, and/or are dispersed enough so as to cumulatively, or singularly, be substantially unnoticeable and thus leave the entire unit affected primarily by the forces of nature. The imprints include the remains of an old sawmill, several ways in the eastern portion, several fencelines and corrals in the western portion, a short way on Pinon Mesa leading to an empty reservoir, and a few mine workings atop The Palisade. Field checks also determined that a short access road to an abandoned drill pad exists in the western portion of the unit.

Interim management activities in this unit to date include one seismograph line constructed by helicopter, a drainage modification for flood control, and the upgrading of a road on the southern edge of the unit.

Outstanding Solitude. The Palisade offers outstanding opportunities for solitude primarily due to topographic screening in the many gulches and canyons in the lower elevations. The heavy vegetative screening and difficult accessibility of the upper elevations enhances opportunities for solitude. A feeling of spaciousness occurs because of the outstanding view one is exposed to both inside and outside the unit. Because of the numerous isolated pockets in the lower areas, one is also able to experience intimate solitude. The blocked configuration of the unit enhances opportunities for solitude by ensuring that outside influences will not disrupt feelings of seclusion.

Outstanding Primitive and Unconfined Recreation. The Palisade unit provides a rugged and varied landscape in which to hike, backpack, sight-see, horseback ride, climb, hunt, trap, fish, photo-

graph, or study nature. Scenic views of the LaSal Mountains in Utah are excellent. The hiker, or backpacker, is presented with a high degree of challenge and risk due to the variety and steepness of the terrain in parts of the unit. In addition, the hiker is constantly exposed to outstanding scenery both within and outside the unit. Opportunities exist to view and photograph the Fritillary butterfly in one of the two critical habitats in Colorado. Hunting and trapping are considered fair to good in the unit. Fishing is considered good for brook and rainbow trout in the North Fork of West Creek. Overnight camping areas for backpackers are plentiful. Perennial water is also available in part of the unit.

Special Features. The Palisade, the rocky spine that cuts the unit north and south, is one of the most prominent features of the Dolores River Valley. It and many of the other rock features in the unit such as the hoodoos (mushroom shaped rocks) lend themselves well to interpretation. The most significant scientific value is the presence of a rare butterfly, Nokomis Fritillary (*Speyeria nokomis nokomis*). This butterfly is presently being considered for classification under the *Endangered Species Act* (1973). The habitat in use is in the southeastern corner of the unit and is one of two such habitats in the state. Approximately 75 percent of the butterfly's critical habitat in Unaweep Canyon is within the unit.

Locatable Minerals

Within this WSA, there are no patented mining claims and 60 unpatented claims; including a uranium claim atop The Palisade. The only locatable minerals known are uranium/vanadium and alabaster. Overall, locatable minerals are considered to have low potential based upon a BLM mineral report.

Oil and Gas

This unit includes a portion of one pre-FLPMA oil and gas lease of 120 acres (Fig. I-14). There are no post-FLPMA oil and gas leases in this unit. Potential for development of the area is rated low, and there has been no drilling activity.

Forestry

The unit contains 1,654 acres of productive pinyon-juniper woodland (857 acres nonsuitable due to adverse location, 797 acres of productive pinyon-juniper on eastern side)(Fig. I-14). They are characterized by 40 percent crown cover and side slopes of less than 35 percent. These are consid-

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ered fair to good stand in terms of productivity. The stands on the east side are readily accessible. They are 50 to 75 percent juniper. The stands contain numerous juniper posts and would yield 7 to 10 cords of pinyon per acre. Historical pinyon-juniper harvest occurs on the eastern side of the unit.

Recreation

Presently this WSA is managed as a wildland area to protect its backcountry recreation and scenic values. The dominant recreation opportunity spectrum setting is semi-primitive non-motorized (Fig. I-13).

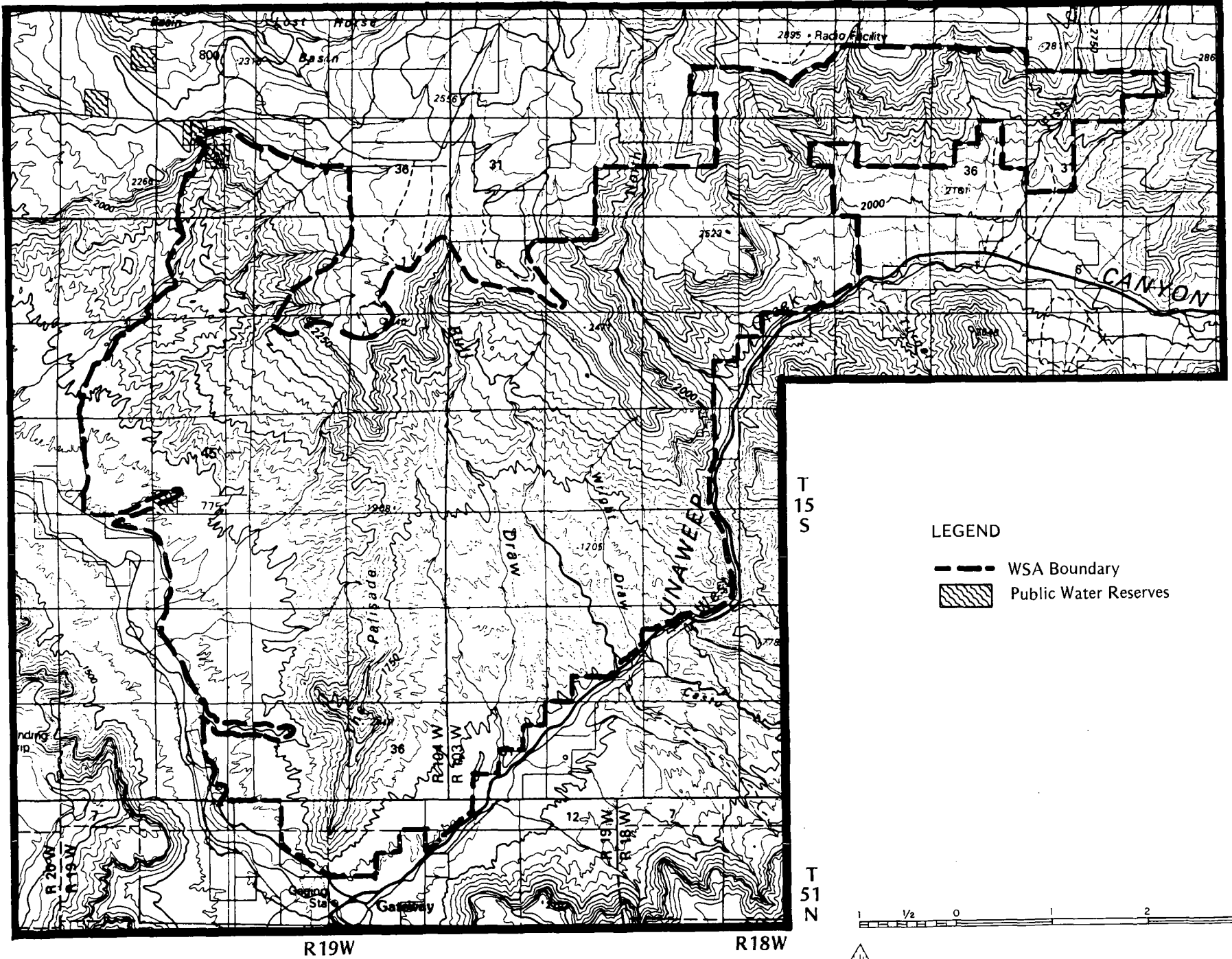
Recreation in this unit consists primarily of ORV use and a limited amount of deer hunting and hiking. Hiking use is generally centered on viewing and photographing The Palisade and other interesting geologic features. Some sport fishing also occurs on the North Fork of West Creek which sup-

ports a trout fishery. Off-road vehicle use includes both 4-wheel drive and motorcycles and appears to be increasing throughout the Bull Draw/Wright Draw areas. Estimated use for the entire WSA is 2,000 visitor days.

Off-Road Vehicles (ORV)

Most of the ORV use in this area is concentrated in the drainage between The Palisade and the major ridge above Wright Draw. Some ORV use is also occurring in the west side of The Palisade (Fig. I-14). Currently the unit is limited to existing roads and trails; however, evidence of cross-country ORV travel is everywhere in this area.

Approximately 1,200 visitor days of ORV use is occurring in the unit. This use is spread throughout the year, including winter months. Field observation indicates that off-road vehicle users are not only from the local area, but also from west central Colorado.



LEGEND

- WSA Boundary
- Public Water Reserves

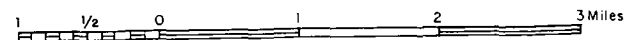


Figure I-12. The Palisade Wilderness Study Area.

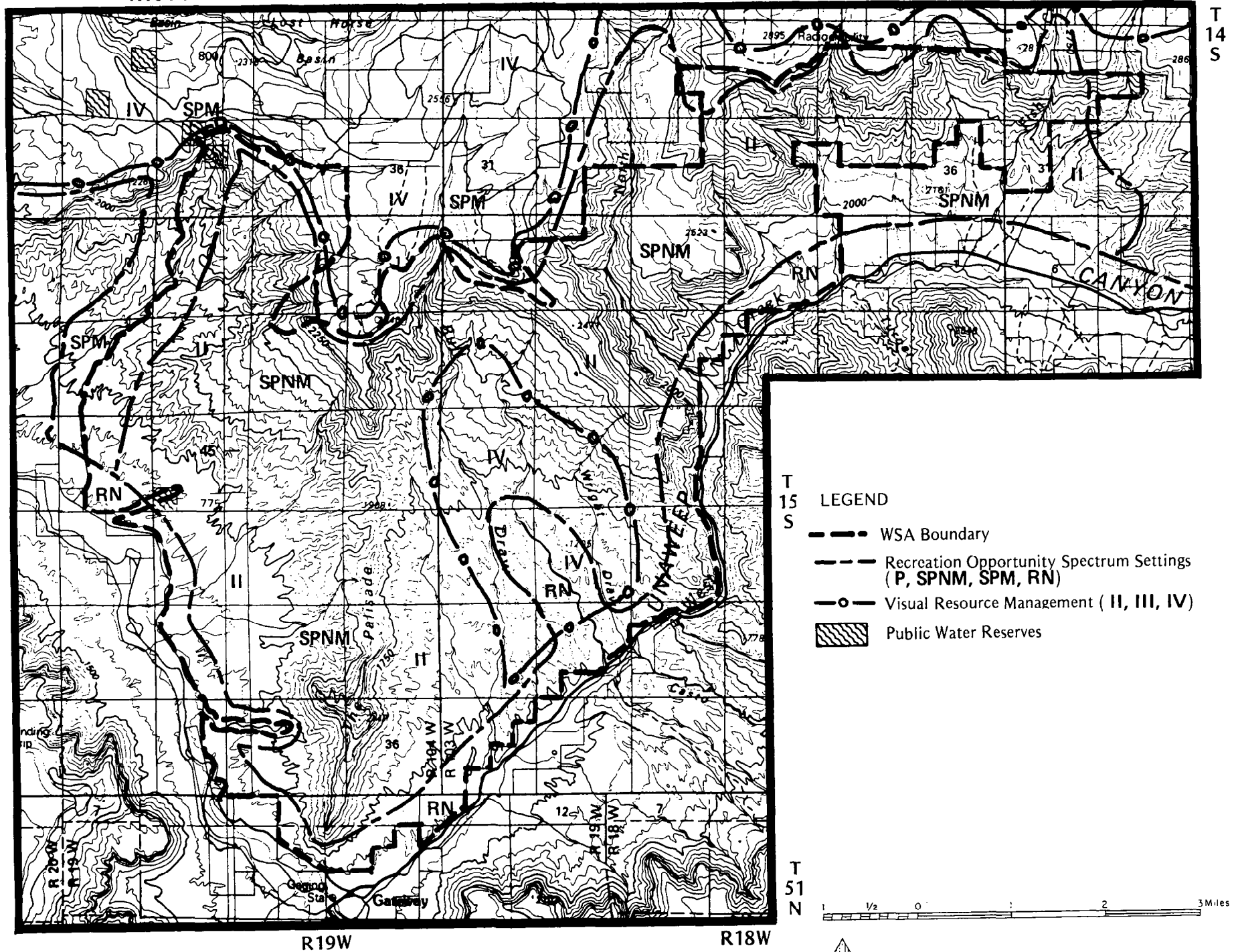


Figure I-13. Recreation and Visual Resources, The Palisade Wilderness Study Area.

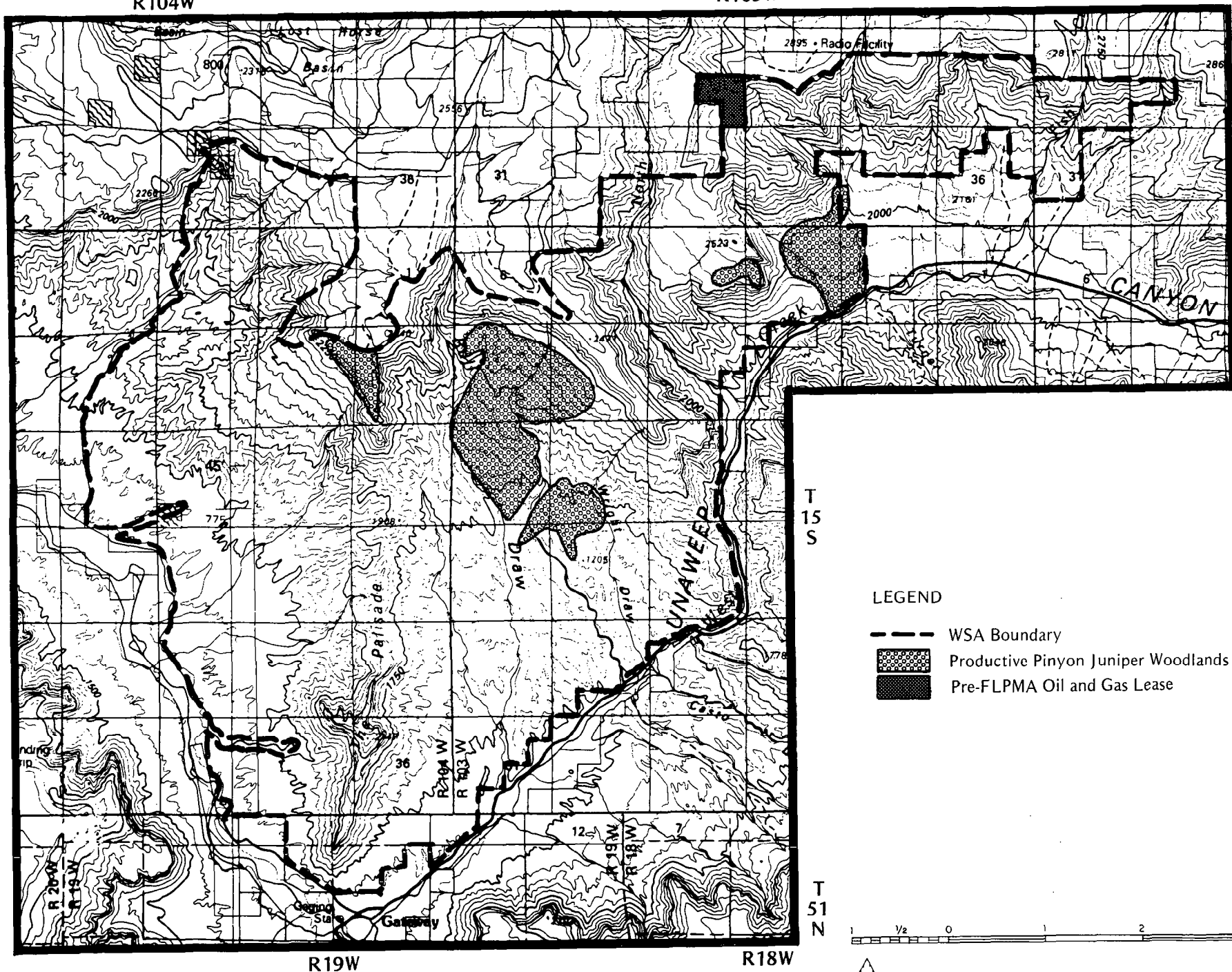


Figure I-14. Issue Resources, The Palisade Wilderness Study Area.



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DOMINGUEZ CANYON WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. The WSA contains 75,800 acres of public land administered by BLM. It is well blocked except for a chained area that enters the west side of the area and 600 acres of state owned land near the southern boundary. Low-impact roads have also been cherry-stemmed in the northern part of the unit (Fig. I-15). A parcel of private land (320 acres) is included inside the cherry-stem in Little Dominguez Canyon.

Naturalness. The unit is characterized by two deeply dissected major canyon systems draining northeast off the Uncompahgre Plateau into the Gunnison River. The drainage patterns have contributed to the formation of isolated northeast-southwest trending mesas. Vegetation ranges from riparian vegetation and Douglas-fir in the canyons to pinyon-juniper woodlands with sage parks on the mesas.

The mesas within the unit appear to be affected primarily by the forces of nature. Imprints of man on the mesas include ways, stock reservoirs, corals, and a few short sections of fence. The imprints of man are minor in that individually they affect only a small portion of the unit. Rolling topography, in conjunction with dense pinyon-juniper vegetation, reduces the visibility of the man-made imprints within the unit. Both of the canyon systems appear to be affected primarily by the forces of nature except for several minor modifications. There have been no interim management activities.

Outstanding Solitude. Topographic screening is provided by the deep, rugged canyons and by steep-sided, isolated mesas. The dense pinyon-juniper woodland which covers much of the unit provides vegetative screening. From the parks and ridges on the mesas, the vast views of distant mountain peaks, plateaus, and valleys impart a feeling of spaciousness while the deep canyons create feelings of seclusion and isolation. These combined factors provide outstanding opportunities for solitude within the Dominguez Canyon unit.

Outstanding Primitive and Unconfined Recreation. The highly scenic Dominguez Canyon provides easy-to-moderate hiking and riding routes. More challenging cross-country routes are available throughout much of the rest of the unit which is characterized by rugged tributary canyons, isolated mesas, and steep-sided mesas. Rock climbing is possible on many of the canyon walls and rocky ledges. The presence of perennial water in Dominguez Creek enhances the recreation opportunities

in the unit. Other recreation pursuits available within the area include hunting, cross-country skiing, photography, and sightseeing. The high scenic quality and diversity of topography within the unit provide for outstanding opportunities for primitive and unconfined recreation.

Special Features. Erosion has exposed seven sedimentary strata and a precambrian bedrock of schist, gneiss, and granite covering a period of geologic history dating back 600 million years. Numerous geomorphic features such as hoodoos, alcoves, and sheer-walled canyons are also available in this unit, creating a geologically and scenically interesting environment. The unit is rich in fossilized bones (from the late Jurassic Period). Fossil finds from the area include portions of the largest dinosaur ever found (Ultrasaurus). The unit also contains three rare and endangered plant species and a variety of large archaeological sites. The unit provides important wildlife habitat for deer, elk, black bear, and bighorn sheep.

Locatable Minerals

There are no patented mining claims and 61 unpatented mining claims in the WSA. Mining claims in Big Dominguez Canyon have involved the periodic use of vehicles on a low impact, 6-foot wide cherry-stemmed road (Fig. I-17). New activity (casual use) at these claims has involved gold placering. Overall, mineral evaluations of the unit's mineral potential has indicated there are no known mineral deposits. Mining claims being worked have a low economic potential.

Forestry

The WSA contains 9,164 acres of productive pinyon-juniper woodland stands characterized by a minimum of 40 percent crown cover and slopes less than 35 percent (Fig. I-17). Their productivity is considered good to excellent stands as they would yield 8 to 20 cords per acre, with a pinyon volume as high as 75 percent. Their high productivity in this area is due to the higher rainfall associated with higher elevations. Some of the stands are readily accessible by low-use, maintained roads. Stands south of Little Dominguez are generally not accessible from the north.

Wildlife

The pinyon-juniper woodland, sagebrush and riparian vegetation types in the WSA support a variety of wildlife, including bighorn sheep, deer, elk (winter), mountain lion, black bear, wild turkey and

Issue Resources Specific to WSAs

chukar. Aquatic habitat is found along Big and Little Dominguez Creeks. All of the habitat types are static to improving in condition.

The nucleus of a future herd of bighorn sheep have been introduced into the WSA. Presently, there are about 20 animals in Big and Little Dominguez Canyons.

The WSA is underutilized by wildlife due to long distances from water. Opportunities exist to develop water catchment devices and to improve forage production through prescribed fire or brush-beating followed by reseeding and provided these actions are beneficial to the wilderness resource.

Livestock Grazing

A general discussion of livestock grazing in designated wilderness is provided in the general issue section at the beginning of Chapter 3 of this appendix.

A proposed range project in the WSA would consist of constructing a stock trail from the area of the Big Falls in Big Dominguez Canyon up to Star Mesa. Figure I-17 shows the trail alignment. Totally, about 500 feet of trail construction would be involved, including about 170 feet of blasting in sandstone outcrops. The trail would be used to move livestock up Big Dominguez Canyon to prevent overuse of the canyon bottom and to better utilize the forage on and near Star Mesa.

Recreation

Currently, the WSA is managed as a wildland area to protect its primitive recreation and scenic values. Primitive is the major recreation opportunity spectrum class and is centered on the unit's canyons. All the recreation opportunity spectrum classes for the unit are shown in Figure I-16.

The WSA is popular for hiking, backpacking and viewing indian rock art. A major focal area of use is the 'Big Falls' that fall more than 65 feet in Big Dominguez Creek. This area provides for sun bathing and swimming in the large pools. Total recreation use in the WSA is about 3,000 visitor days.

Land Tenure

Three hundred and twenty acres of private land in Little Dominguez Canyon and 600 acres of state land (Division of Wildlife) near Escalante Canyon are being evaluated for acquisition, pending wilderness designation.

Transportation

The WSA has very good public access from Big Dominguez campground and trailhead, Bridgeport trailhead, and Gunnison Gulch. Private property generally blocks access along the Gunnison River and the lower part of Escalante Canyon. Access is also available through the chainings on Steamboat, Middle, and Long Mesas.

The private property owner in Little Dominguez Canyon gains access via the Bridgeport Bridge, which is closed to the public except for foot access. The bridge is locked and vehicle access is provided only to the ranchers operating in the area, the miner with claims in Big Dominguez Canyon, and the private property owner in Little Dominguez Canyon. A trailhead was developed about three-quarters of a mile from the bridge to reduce vandalism. Cherry-stemmed roads are located in Big and Little Dominguez Canyons, as shown on Figure I-17.

Another cherry-stemmed road goes from Long Mesa to Star Mesa. The road is in poor condition and is used primarily for grazing administration.

Issue Resources Specific to WSAs

SEWEMUP MESA WSA

Wilderness Values

Mandatory Wilderness Characteristics.

Size. The WSA contains 19,140 acres of public land administered by BLM. The WSA is oblong in shape and well blocked (Fig. I-18).

Naturalness. The Sewemup Mesa unit consists of two prominent geological features: the sloping mesa top of Sewemup Mesa and the fringes of the collapsed salt dome of Sinbad Valley. The Sinbad Valley portion of the unit consists of a landscape sloping down from the cliff face which surrounds Sewemup Mesa. Vegetation in Sinbad Valley consists of a combination of pinyon-juniper woodlands and sagebrush flats with open, grassy meadows. Sewemup Mesa is an isolated mesa top with sheer cliff faces that are 500 to 700 feet high. The mesa top is highly dissected by numerous shallow canyon systems. Pinyon-juniper woodlands are the predominate vegetation type of the mesa top.

Most of the imprints of man are located in the Sinbad Valley portion of the unit. All three of the ways that occur in this area are considered to have a minimal impact on the naturalness due to minimal disturbance and effective vegetative screening. The upland area of Sewemup Mesa contains no imprints of man and is considered to be a pristine natural environment.

Interim management activities include several seismograph tests which have been run across the mesa tops. Minimal impacts occurred to the unit from the seismic work because the work was done by helicopters. Salinity projects are currently being evaluated for Salt Creek on the northern edge of the unit.

Outstanding Solitude. The Sewemup Mesa unit offers outstanding opportunities for solitude. The presence of numerous drainages on the mesa creates a landscape in which visitors can become readily dispersed without encountering other visitors. Outstanding opportunities for solitude are intensified by the rolling topography of the mesa top. The dense pinyon-juniper woodland on the upper part of Sewemup Mesa also enhances opportunities for solitude. The presence of a sheer cliff wall around most of the mesa top also adds to the solitude of the unit since it provides an almost impassable barrier to the outside world. The physical size of the area together with its topography and configuration enables this unit to contain outstanding opportunities for solitude.

Outstanding Primitive and Unconfined Recreation. The Sewemup Mesa unit contains outstanding opportunities for day hiking, backpacking,

scenic viewing, nature study, and technical rock climbing. The high degree of landscape diversity created by the numerous drainages flowing intermittently off Sewemup Mesa provides an interesting landscape that is attractive to the day hiker and the backpacker. Other interesting features such as the extensive outcroppings of slickrock and the prominent Entrada Knolls in the northwestern corner of the mesa also add to the ability of the landscape to provide outstanding opportunities for these types of primitive recreation. The diversity of vegetation types within the unit also adds to the hiking or backpacking experience. The unit also contains outstanding opportunities for technical rock climbing on the Wingate Cliff faces that surround most of Sewemup Mesa.

Special Features. Several significant special features exist within the Sewemup Mesa unit. Sewemup Mesa, according to one story, derives its name from the cattle rustling practices of the McCarty gang. The unit also contains archaeological values. The collapsed salt dome of the Sinbad Valley portion of the unit provides an example of an unusual geologic feature. Sewemup Mesa is also one of the last areas in this region which represents an ecosystem undisturbed by the workings of man.

Water Resources

A series of seeps and springs surface in Salt Creek just outside the northern boundary of the WSA. A study of this saline point source has been authorized by Congress. Present proposals for disposal of this brackish water involve construction of a cut-off wall to bedrock, rock sump, pump, and pipeline downstream of the spring emergence area. The water would be caught by the cut-off wall and piped to Sinbad Valley where it would be discharged into evaporation ponds or injected into an existing abandoned gas well. This could potentially involve approximately 15 acres within the WSA.

Locatable Minerals

There are 75 unpatented and no patented mining claims inside this WSA. BLM has determined that the unit's mineral potential is low. However, mineral development on the west side of Sinbad Valley may provide new knowledge of mineral values, specifically gold and silver. One hundred seventy-five tons of ore and overburden have been removed in a new mine. The ore is now being processed to determine the development potential. The claimants are also obtaining permits and are expected to begin mining in the spring of 1985. Faulting along the base of the escarpment on the west side of

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Sewemup Mesa shows some indications of similar mineralization to that in the area of the mine.

Oil and Gas

Currently, there are no oil and gas leases in this WSA, partly because the mesa top is closed to leasing (12,197 acres). Most of the remainder of the area (5,283 acres) has a stipulation for no surface occupancy (NSO). An abandoned well and access route are located in the northwest quadrant of the WSA. BLM records indicate this well was drilled three separate times, but it was still unsuccessful.

The WSA has been classified by BLM as being prospectively valuable (PV) for oil and gas and has a moderate development potential. This classification is given to PV lands with no indication of producible oil and gas and which are expected to be involved in oil and gas development.

Recreation

Currently this WSA is managed as a wildland to protect its primitive and scenic values. The WSAs

mesa top is all recreation opportunity spectrum class primitive (Fig. I-19). The Sinbad area was classified semi-primitive motorized.

The area is primarily used for hiking and is known throughout the state, although total use is still low at about 500 visitor days. Some deer hunting also occurs in the unit at lower elevations. The eastern side of the unit forms the canyon wall for float-boaters on the Dolores River.

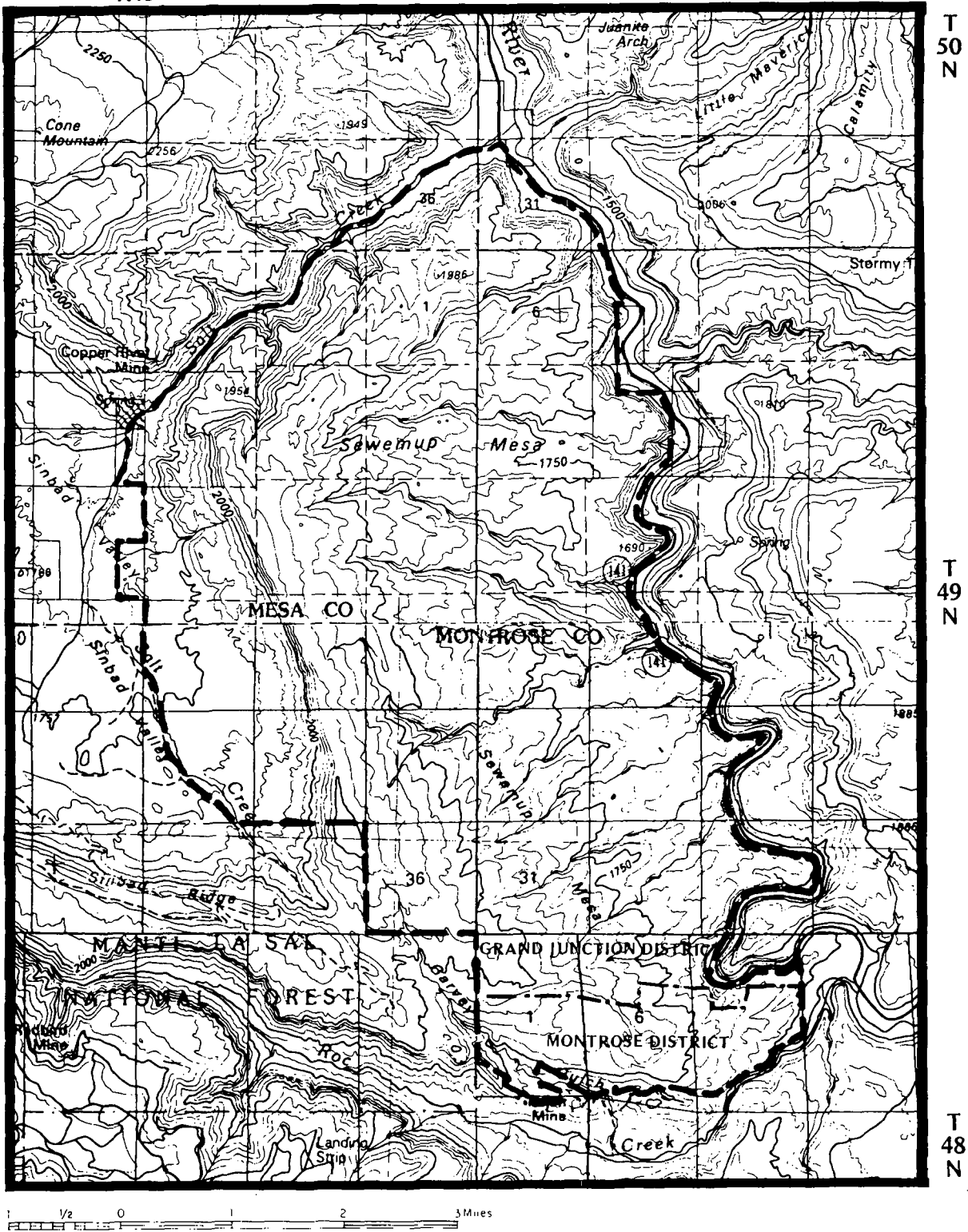
Utility Rights-of-Way

Colorado State Highway 141 forms the eastern boundary of this WSA along with three parcels of private land. It has been anticipated that future power lines or phone lines (surface or buried) may wish to locate along this boundary. No specific projects have been formulated. This could potentially involve 45 acres within the WSA.

SEWEMUP MESA
R19W

CO - 070 - 176 - SEW
CO - 030 - 310A

R18W



LEGEND

- WSA Boundary
- - - District Boundary

Figure I-18. Sewemup Mesa Wilderness Study Area.

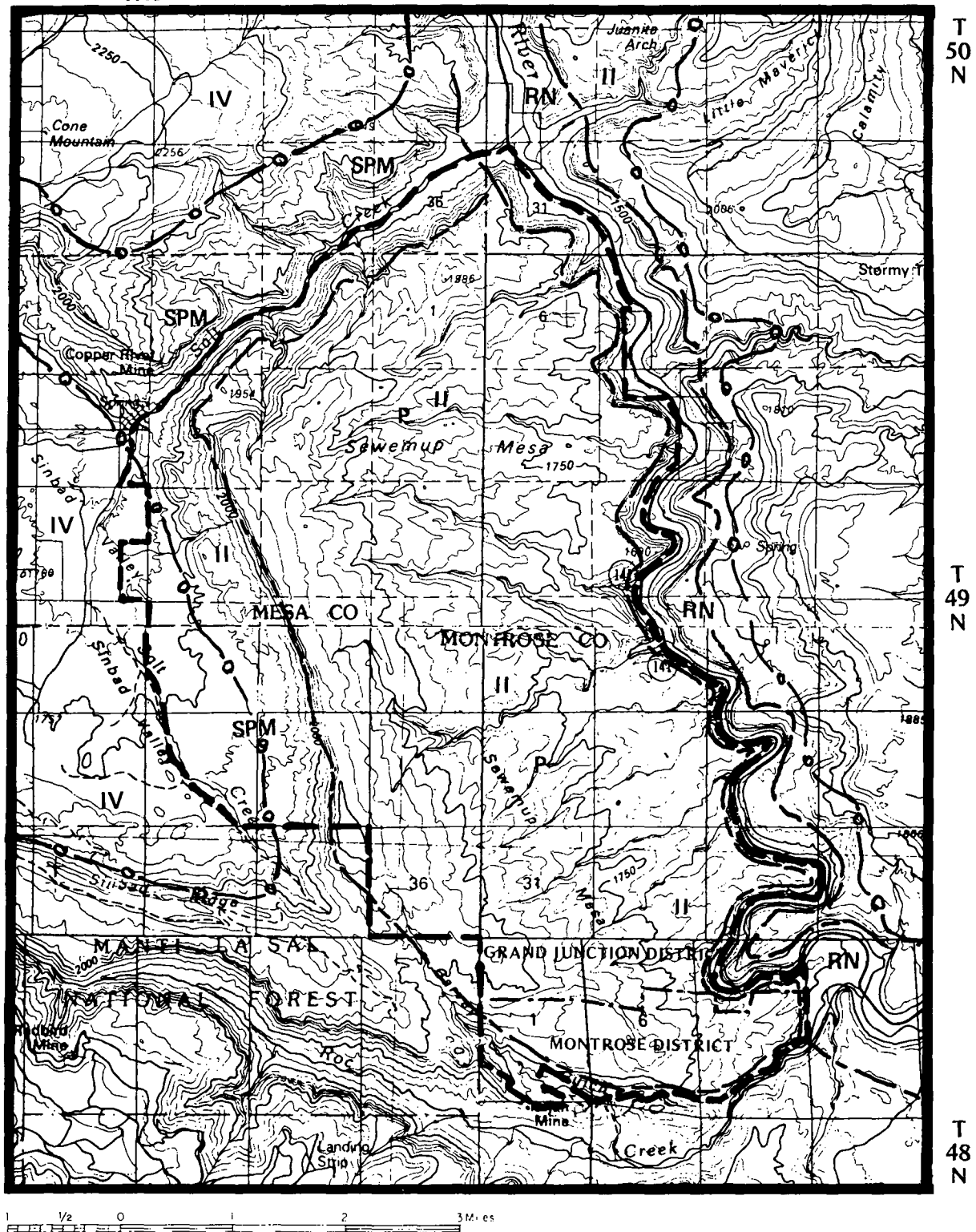
SEWEMUP MESA

CO - 070 - 176 - SEW

CO - 030 - 310A

R19W

R18W



LEGEND

- WSA Boundary
- Recreation Opportunity Spectrum Settings (P, SPM, RN)
- Visual Resource Management (II, III, IV)
- District Boundary

Figure I-19. Recreation and Visual Resources, Sewemup Mesa Wilderness Study Area.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the environmental consequences of the six alternatives as they affect the seven WSAs. General resource impacts are discussed first followed by an analysis of the issues specific to each WSA. The time frame for this analysis is 20 years (1985-2005).

ASSUMPTIONS

It is assumed that wilderness recommendations will be acted upon by Congress by 1991. Short and long-term impacts will be noted where appropriate to show environmental trends. Short-term impacts will be considered those impacts from the present until 1991 (when Congressional action on WSA is assumed). Long-term impacts extend from 1992-2005. Other assumptions for this chapter are as follows:

1. BLM would have funding and work force to fully implement each alternative including the capability to implement the wilderness management plans for areas designated wilderness. Off-road vehicle designations would be strictly enforced in all WSAs.
2. The *Final Wilderness Management Policy* (1981) would provide the guidance as to how all activities would be managed in BLM designated wilderness. Specific guidance would be provided through development of a wilderness management plan which would be developed within two years after a WSA is designated wilderness.
3. There would be no changes in the laws affecting the development of pre-FLPMA mineral leases or other valid existing rights in wilderness areas.
4. In evaluating the suitability recommendations of each WSA, nonwilderness resource recommendations were analyzed as though BLM's *Interim Management Policy and Guidance for Lands Under Wilderness Review* (IMP) is not in effect. Consistent with the IMP, all WSAs are currently closed to mineral leasing pending completion of wilderness review. Again, for purposes of analysis, this leasing moratorium will be ignored. In actuality, the IMP does protect Congress' option to designate a WSA as wilderness by requiring special management of all WSAs to prevent impairment of wilderness values. Removal of these constraints is necessary to allow a complete analysis of all alternatives.
5. The Dominguez Canyon WSA is the only unit in this analysis containing nonfederal land. It is assumed that private and state owned lands in this unit would be acquired once Congress designates the area wilderness. Acquiring these lands would occur only with the support of the state (Colorado Division of Wildlife) and the private land owner.
6. Based on current usage trends, it is assumed that recreation use in the Grand Junction Resource Area would continue to increase at a rate of about 8 percent annually. Nationwide recreational use of wilderness is growing at a rate of about 10 percent annually (Hendee and Stankey 1973). It is assumed in this resource area, that after wilderness designation, wilderness use in WSAs designated would increase to about 15 percent annually for the first two to three years due to the high quality wilderness experience some of the WSAs provide and general knowledge of the WSAs in the region, and then a 10 percent increase annually thereafter.
7. It should be noted that reclamation is referring to a general reshaping of the surface, soil erosion stabilization and reestablishment of vegetation. In many locations in this very steep plateau topography, reclamation would probably not be able to return the disturbed area to a natural appearance in the WSAs by the time of Congressional action. Therefore, acres reclaimed during development would generally be ignored in assessing impacts and be assessed as disturbed areas.
8. The No Wilderness Option in each alternative satisfies the wilderness study policy of identifying how WSAs would be managed if selected for nondesignation. However in the preferred alternative, specific nonwilderness management has been developed for each WSA determined preliminarily suitable for wilderness. In the event Congress does not designate all the recommended WSAs for wilderness, these nonwilderness management actions would provide a subalternative to the preferred alternative.

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tive. These subalternatives are addressed in Chapter 5 of this appendix.

NON-ISSUE/RESOURCE IMPACTS COMMON TO WSAs

IMPACTS ON AIR QUALITY

Wilderness designation does not mean an automatic change in air classification. The Department of the Interior would not recommend reclassification to the more strict Class I in connection with future wilderness recommendations resulting from the BLM wilderness review. The two processes are separate and distinct, and are accomplished under two different laws, FLPMA and the Clean Air Act. Recommendations for wilderness designation are made by the BLM through the Secretary of the Interior and the President to Congress. Air quality reclassification is the prerogative of the States, and it must follow a process mandated by the Clean Air Act Amendments of 1977, involving a study of health, environmental, economic, social, and energy effects, a public hearing, and a report to the Environmental Protection Agency. The Department would not recommend any change in air quality classification as part of wilderness recommendation.

IMPACTS ON SOILS

Oil and gas development in the Demaree and Little Book Cliffs WSAs would increase short-term soil erosion until reclamation of disturbed areas takes place. Surface disturbance on the high slump hazard soils in the Demaree WSA would accelerate erosion and would be a potential hazard to any structures, pipelines, roads, or other surface occupancy on these soils.

IMPACTS ON WATER RESOURCES

Designating areas preliminarily suitable for wilderness would benefit water quality by preventing potential surface disturbing activities from development from occurring. Nondesignation would open the areas to oil and gas, mining, forest management, and other activities where these resources are present. These activities often result in sedimentation impacts from their associated surface disturbances which include road, drill pad and pipe-

line construction. This increased sedimentation would degrade existing water quality to some extent for short durations.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

The protection of wilderness values would have benefits and virtually no disadvantages to sensitive, threatened and endangered species. Reintroduction and water projects could be done in an acceptable manner protecting wilderness character and facilitating the objectives for the species.

IMPACTS ON VISUAL RESOURCES

Specific visual resource impacts were considered for Demaree Canyon and Little Book Cliffs WSAs due to major surface disturbing activities anticipated from projected mineral development. Based on proposed management actions, visual change was not considered a major problem in the other WSAs. Impacts from other developments would be very localized and generally within the levels of acceptable change for the VRM classes in the other WSAs. After wilderness designation, visual resources would be managed under VRM Class I objectives.

IMPACTS ON LAND TENURE

No land disposals are planned in any of the WSAs. Land acquisition would occur only in the Dominguez WSA. See Dominguez Canyon site-specific analysis for land tenure proposals.

IMPACTS ON WITHDRAWALS

Congress would have to determine if the existing withdrawals are compatible with wilderness designation. If Congress designates any of the wilderness areas, then the existing withdrawals could be categorically revoked, where appropriate, at the time of designation.

The Dominguez Dam project which would use the Bureau of Reclamation withdrawals along the Gunnison River is presently on hold (telephone conversation, Larry Kysar, U.S. Bureau of Reclamation, 1/9/85). The U.S. Bureau of Reclamation Regional Office in Salt Lake City is preparing a report to preserve completed studies on the project.

Issue/Resource Impacts Common to WSAs

Boundary adjustments in the Preferred Alternative for Dominguez Canyon WSA would reduce the potential conflict to a minimal level.

IMPACTS ON FIRE

Designated wilderness areas would first be considered for limited suppression. Limited suppression implies minimal response to fires in areas where hazards to firefighters and suppression costs are high and where fire effects are positive or neutral to resource values. As a minimum response, fires would be monitored.

Designated wilderness areas that have been found unsuitable for limited suppression would be managed under wilderness suppression. Wilderness suppression implies restraint in fire suppression methods. The fire management objective is to suppress fires in ways that would cause the least degradation to wilderness values.

Under extreme weather conditions and with continuous fuel distribution, the potential for large fires exist in these areas. Due to the lack of many significant improvements in the WSAs, the threat of disastrous fires (those causing major damage) is low.

ISSUE/RESOURCE IMPACTS COMMON TO WSAs

IMPACTS ON OIL AND GAS

Wilderness designation of lands with low development potential (e.g., Black Ridge Canyons, Black Ridge Canyons West, Dominguez Canyon, and The Palisade) would result in the loss of rental income and foregoing any possible resources that might be present. However, it is unlikely that lease applications would be received for these lands or that any development activity would occur. The overall impact would be low.

The impacts of closing land to oil and gas leasing and development vary according to the development potential of the WSA involved. Wilderness designation of lands with moderate development potential (e.g., Sewemup Mesa) would result in lost rental income and foregoing recovery of any possible resources that might be present. However, it is unlikely that any oil and gas activity would occur on these lands as compared to lands with high development potential. The overall impact would be moderate.

Wilderness designation of lands with high development potential (e.g., Demaree Canyon and Little Book Cliffs) would result in the loss of rental income and foregoing any possible recovery of resources that may be present. Both the Demaree Canyon and Little Book Cliffs WSAs are entirely leased for oil and gas development. Since the majority of these leases are pre-FLPMA, the likelihood of development is high. Wilderness designation would not affect these pre-FLPMA leases. However, closing the lands in Demaree Canyon and Little Book Cliffs WSAs to further oil and gas leasing would prevent development of post-FLPMA leases (Demaree Canyon—1,750 acres, and Little Book Cliffs—3,880 acres). The overall impacts of wilderness designation would be high.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Although wilderness designation offers protection to paleontological values by preventing surface-disturbing activities, many times fossils are found through surveys prior to surface activities or during field work. This would no longer be the case. Also, when fossils are found within the wilderness areas, stipulations to protect wilderness values would preclude large scale quarries and make transport of large (dinosaur) fossils difficult.

IMPACTS ON CULTURAL RESOURCES

Although wilderness designation offers protection to cultural values by preventing surface-disturbing activities, many times cultural materials are found through surveys prior to surface activities or during field work. This would no longer be the case. Stabilization and research efforts may be limited where it would be necessary to undertake activities protecting cultural resource values or investigating outstanding scientific values. All work would have to be identified on a case-by-case basis and conducted in a manner designed not to degrade overall wilderness values.

One historic structure in Sewemup Mesa would require stabilization work to protect it. Compliance with Section 106 of the National Historic Preservation Act would be required for the 43 National Register of Historic Places eligible sites found within WSAs.

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IMPACTS ON LIVESTOCK GRAZING

BLMs *Wilderness Management Policy* provides specific guidance for livestock grazing operations. Maintenance of existing facilities would be allowed as well as construction of new improvements which are consistent with approved allotment management plans and/or which are necessary for protection of the range. Construction of new improvements should be primarily for the purpose of resource protection and more effective management of those resources rather than to accommodate increased numbers of livestock.

In designated wilderness, the minimum tool rule applies to all management including grazing administration. It simply states that management practices must represent the minimum departure from the naturalness of the wilderness. Tools or equipment must be selected and used that minimize degradation of wilderness values. Where feasible, non-motorized equipment should be used. Where practical alternatives (such as horseback) do not exist, maintenance or other activities may be accomplished through the occasional use of motorized equipment such as backhoes to maintain stock ponds, pickup trucks for major fence repair or special equipment to repair stock watering facilities. Such motorized uses would be specifically authorized through the grazing permits. In summary, livestock grazing in accordance with BLM's *Wilderness Management Policy* would have minimal impacts on wilderness values and grazing use.

IMPACTS ON LOCAL SOCIAL AND ECONOMIC CONDITIONS

Designation of all seven WSAs as wilderness would increase recreation use in the Grand Junction Resource Area. Improved access and greater public awareness of these areas would draw recreationists from outside the resource area. Wilderness recreation use is assumed to grow 15 percent annually from current levels for the first two to three years after designation and then 10 percent annually. The resultant 43,400 visitor days by the tenth year would generate an increase in local income of as much as \$334,000 annually and as many as 34 new jobs. This is not a large increase in economic activity (about 1/10 of 1 percent), but some benefits could be noticed in smaller communities in the southern portions of the resource area.

Generally, the economic consequences of restricted mineral development, except for coal, would not be great either because the mineral resources are of low economic potential (as with lo-

catable minerals) or because the mineral rights have already been secured through pre-FLPMA leases (as with oil and gas leases). Loss of potential gas production from post-FLPMA leases in Demaree Canyon and Little Book Cliffs WSAs is estimated to eventually result in the loss of just over \$1 million in gas sales annually, representing about \$150,000 in federal royalty revenue and nine local jobs. Designation of the Demaree Canyon and Little Book Cliff units would also prevent new coal leasing in areas adjacent to existing leases. This could prevent expansion of current coal lease tracts in adjacent areas.

Designation of four WSAs as wilderness would increase recreation use in the Grand Junction area as a result of improved access and greater public awareness. Wilderness recreation use is assumed to grow 15 percent annually from current levels for the first two to three years after designation and then 10 percent annually. The resultant 32,500 visitor days by the tenth year would generate an increase in local income of perhaps \$250,000 annually and as many as 26 new jobs. This is not a large increase in economic activity (less than 1/10 of 1 percent), but some benefit could be noticed in smaller communities in the southern portion of the resource area.

The economic consequences of restricted mineral development would not be great as the identified mineral resources are of low economic potential.

ISSUE/RESOURCE IMPACTS SPECIFIC TO WSAs

DEMAREE CANYON

No Action and No Wilderness Alternatives Impacts

Under these alternatives, the entire Demaree Canyon WSA (21,050 acres) would be recommended unsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation of Demaree Canyon WSA would result in the long-term impact of the loss of wilderness values and the failure to expand the ecological diversity of the National Wilderness Preservation System (NWPS). Under this alternative, oil and gas development would segment the area into parcels less than 5,000 acres in size, alter its naturalness and roadlessness, and disrupt feelings of outstanding solitude. Subsidence and possible surface cracking from underground mining could create hazards to recrea-

Issue/Resource Impacts Specific to WSAs

tionists. Developing roads would spread motorized use throughout the unit disrupting opportunities to experience outstanding solitude and opportunities for primitive recreation. Motorized use would, in the long term, dominate the recreation use in the WSA. Regionally, this WSA typifies the Book Cliffs which is an unusual physiographic feature of west central Colorado and western Utah. This is one of two remnant natural ecosystems being studied for wilderness in the Book Cliffs in Colorado. The remainder of the Book Cliffs have been generally developed for mineral values. Presently, this ecotype is minimally represented in the NWPS. In this alternative over the long term, the Demaree Canyon WSA's wilderness values would be lost; which would be a major adverse impact. Loss of its wilderness values and physiographic features would be a moderate adverse impact on the National Wilderness Preservation System.

Impacts on Coal. Currently no activity is taking place on the 222 acres of the pre-FLPMA coal leases. However, the potential for development exists including more exploration activity on the lease. Because of the terrain and depth of the coal, underground mining would be required in this area. Depending on mining techniques and depth of overburden, surface expressions of subsidence could occur in the WSA.

Further leasing of the remaining 20,828 acres in the WSA would help to recover the 274 million short tons estimated to be in-place. Overall, this would be a moderate beneficial impact to coal over the long term.

Impacts on Oil and Gas. Currently two wells have been drilled on the unit's many leases. One along the northern boundary was a dry hole and has been plugged and abandoned. Another, in Dry Gulch, is a producing well connected to a lateral pipeline. Development of the leases could occur anywhere in the unit dependent on economic conditions.

Based on BLM development projections, there could be 33 new wells drilled in this WSA over the next 20 years. Associated with these wells would be 33 miles of new roads and 19 miles of new pipelines. Total surface disturbance is estimated to be 249 acres. A 57 percent success rate on drilled wells is assumed. Reclamation would recover about 50 percent of the disturbed area within 5 years of the disturbance. Abandoned wells would be totally reclaimed within 5 years. For purposes of wilderness related impacts, this success is considered much less (see assumption 7). Some protection from surface disturbance would be afforded on approximately 2,500 acres by a no surface occupancy stipulation developed due to high soil slumping hazard in the WSA. Recovery of this oil and gas

would be a major beneficial impact over the long term.

Impacts on Recreation. Currently minimal recreation use is occurring in the semi-primitive non-motorized setting. Over time the off-road vehicle use (the area is open) and continued oil and gas and coal development would shift the recreation opportunity spectrum setting to semi-primitive motorized, roaded natural, and rural. New oil and gas roads (up to 33 miles totally) and new coal exploration roads in the Demaree WSA would significantly increase the ORV and hunting use in the area. Over 20 years, a road network would be created that would follow all the major canyon bottoms and ridge tops. Non-motorized users would be displaced by motorized recreationists using these roads. This would be a low to moderate adverse impact over the long term.

Impacts on Visual Resources. Mineral development in the WSA would be consistent with VRM Class IV, which allows a level of change to the characteristic landscape that dominates the view and attracts the major focus of the viewer. Surface-disturbing activities (249 acres totally over 20 years) throughout this WSA would have a long-term impact on its natural landscape. Changes in landform would be evident from oil/gas pads and road construction. Disturbance on the face of the Book Cliffs from road or coal mining related development would probably not meet visual resource management objectives—Class II (east half of WSA) or Class III (west half of WSA). Visual changes in this landscape from mineral development would be a major adverse impact over the long term.

Impacts on Utility Rights-of-Way. This alternative would allow moving the pipeline right-of-way in West Salt Creek eastward into the Demaree Canyon WSA. This new alignment would cause less surface disturbance over a mile and one-half section than if new pipelines had to build into the steep slopes on the west side of the existing corridor.

All Wilderness Alternative Impacts

Under this alternative, the entire Demaree Canyon WSA (21,050 acres) would be recommended preliminarily suitable for wilderness.

Impacts on Wilderness. If there were no pre-FLPMA mineral leases, wilderness designation would protect the units' wilderness values and add an uncommon ecotype to the diversity of the National Wilderness Preservation System. The area would be withdrawn from mineral leasing, and the unit's size, naturalness, and outstanding opportunities for solitude would be protected. The unit is part of the Colorado Plateau Province (pinyon-juniper

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woodland) which is only represented by a few newly designated wilderness areas. The unit is also one of only two areas in the Book Cliffs that qualified for wilderness study. However, due to 92 percent of this WSA being under pre-FLPMA oil and gas leases, this alternative would result in impacts as described in the No Action Alternative. The valid existing rights of these leases are a major management constraint (See Oil and Gas Lease in WSAs discussion in Appendix E and Alternatives Considered but Eliminated in this appendix) that prevents wilderness designation from protecting the area.

Impacts on Coal. Impacts from the existing 222 acres of pre-FLPMA leases would be the same as those under the No Action Alternative. Wilderness designation could not impede the development of this pre-FLPMA lease with valid existing rights. However, wilderness designation would withdraw the remainder of the WSA (20,828 acres) from leasing, effectively preventing recovery of 274 million short tons of coal in the area. This would be considered a moderate, adverse, long-term impact to western Colorado.

Impacts on Oil and Gas. The 1,750 acres of high development potential lands in the 7 post-FLPMA leases would not be allowed to be developed if development would impair wilderness values. Wilderness designation would prevent expiring leases from being offered for lease in the future. This would result in lost rental income and royalty revenues and foregoing oil and gas reserves on such leases. All pre-FLPMA leases on 92 percent of the area would be allowed to be developed. BLM estimates there will be 26 wells, 26 miles of road, and 18 miles of pipeline developed on the pre-FLPMA leases over the next 20 years. This would disturb 198 surface acres. Nondevelopment of post-FLPMA leases would be a minor adverse impact over the long term. Development of pre-FLPMA oil and gas leases would be a moderate to major beneficial impact over the long term.

Impacts on Recreation. This alternative would not enhance opportunities for primitive recreation as would be anticipated. Recreation opportunity spectrum settings would also shift in this alternative toward semi-primitive motorized, roaded natural and rural settings because of the 19,300 acres of pre-FLPMA oil and gas leases that could be developed with supporting access roads. Oil and gas development after wilderness designation could be controlled on only 8 percent of the total WSA (1,750 acres of post-FLPMA leases). The 222 acres of pre-FLPMA coal leases in the very northeast corner would probably have little surface disturbance associated with development, but the area is overlain with pre-FLPMA oil and gas leases. Impacts would be similar to those described in the No Action Alternative. Underground coal mining would create sur-

face subsidence and cracking that could be harmful to recreationists.

Impacts on Visual Resources. Because 92 percent of the WSA has pre-FLPMA oil and gas leases with valid existing rights, wilderness designation could not maintain the quality of the visual resources in this WSA. Impacts would be similar to those described in the No Action Alternative.

Impacts on Utility Rights-of-Way. Wilderness designation would prevent pipelines without valid existing rights from being built inside the WSA. Future pipelines would either disturb the steep western slope of Salt Creek Canyon or be routed around Salt Creek.

Maximum Wilderness Alternative Impacts

Under this alternative, an expanded WSA acreage of 24,500 acres would be recommended preliminarily suitable for wilderness designation (Fig. 1-20).

Impacts on Wilderness. Impacts would be the same as those under the All Wilderness Alternative if pre-FLPMA leases were disregarded. Adding the upper canyons in the northeast corner of the unit would further increase the representation of this ecotype in the National Wilderness Preservation System. Including the cherry-stemmed roads on the northern boundary inside the designated wilderness would enhance opportunities to experience outstanding solitude by eliminating vehicle travel in these corridors. Rehabilitation of these abandoned roads would add to the naturalness of the WSA.

When the pre-FLPMA leases are considered, the impacts resulting mainly from oil and gas development are essentially the same as those described in the No Action Alternative except 1,750 acres of post-FLPMA leases would not be developed nor would any additional coal leasing take place. Impacts from coal leasing would expand from 222 acres to 2,080 acres because more pre-FLPMA coal leases would be added to the unit by the expansion of the area.

Impacts on Coal. Impacts would be essentially the same as those under the All Wilderness Alternative. The major expansion area is in the northeast corner which adds another 1,858 acres of pre-FLPMA leases with valid existing rights. Coal development would not be impeded on these leases and, therefore, coal production would not be affected. The cherry-stemmed areas added into this alternative include about 1,500 acres without pre-FLPMA coal leases that would be closed to future leasing.

Issue/Resource Impacts Specific to WSAs

Impacts on Oil and Gas. The impacts in this alternative are similar to those under the All Wilderness Alternative. The expanded acreage in this alternative of 3,450 acres includes additional acres of pre-FLPMA leases which would add three additional wells, three miles of road, and two miles of pipeline to the development scenario.

Impacts on Recreation. The recreation impacts would be the same as those under the No Action Alternative except 3,450 acres of semi-primitive non-motorized setting would be shifted to semi-primitive motorized, roaded natural and rural from additional surface development. Roads and other surface impacts would be constructed as a result of oil and gas and coal development on pre-FLPMA leases with valid existing rights.

Impacts on Visual Resources. Impacts to visual resources would be the same as those under the All Wilderness Alternative except 3,450 additional acres within the unit would be impacted by mineral development.

Impacts on Utility Rights-of-Way. Any new pipeline rights-of-way would not be permitted in the expanded unit unless it could be determined the project had valid existing rights.

Manageability Alternative Impacts

Under this alternative the entire WSA (21,050 acres) would be recommended unsuitable for wilderness.

Ninety-two percent of the area is covered by pre-FLPMA oil and gas leases. Development of these leases would take place regardless of wilderness designation. Because of their dominance throughout the WSA (Fig. 1-4, Chap. 3), development would significantly impair the wilderness characteristics of the area.

Pre-FLPMA leases, which are held by production within or adjacent to the WSA, adversely affect BLM's ability to manage the area as wilderness in the long term. Because of their wide spread distribution, boundary adjustments to improve manageability are unworkable. Maintenance of wilderness values cannot reasonably be assured and, therefore, the unit is not manageable for wilderness.

Preferred Alternative Impacts

Under this alternative, the entire WSA (21,050 acres) would be recommended unsuitable for wilderness.

Impacts on Wilderness. Due to pre-FLPMA leases on 92 percent of the area, none of the WSA would be manageable for wilderness. Those im-

pacts described in the No Action Alternative also apply to this alternative. This would constitute a major adverse impact to wilderness values over the long term and a moderate adverse impact to the National Wilderness Preservation System.

Impacts on Coal. Further coal leasing and development would allow recovery of the 274 million short tons estimated by BLM to be in reserve in this WSA. Along with the 222 acres of an existing lease, an additional 20,828 acres in the Book Cliffs potential coal development area could be leased and developed. This would be a moderate beneficial impact over the long term.

Impacts on Oil and Gas. Development of all leases in this WSA would allow recovery of the oil and gas reserve thought to be below this WSA. This would be a major beneficial impact over the long term.

Impacts on Recreation. Development of existing leases and possible further coal leasing would shift the area from semi-primitive non-motorized to semi-primitive motorized, roaded natural and even rural (in areas of surface facilities). This is considered a major long-term impact especially in view of primitive recreation opportunities being limited in the Book Cliffs. Recreation use, especially ORVs and hunting, is expected to increase steadily over the long term. Some snowmobiling use is also projected. The Preferred Alternative includes an ORV limitation (limited to existing roads) in this area to protect wildlife. This is considered a low to moderate adverse impact to primitive recreation over the long term.

Impacts on Visual Resources. Development of oil and gas and coal in the WSA would cause major surface disturbance in this very rough topography. The 33 miles of roads, 33 drill pads and 19 miles of pipelines over 20 years with varying degrees of rehabilitation success would transform portions of this natural and wild Book Cliffs landscape into a rural landscape, similar to those that surround it. This represents a major long-term commitment of the visual resource. Impacts would be intensified by the linearity of this surface disturbance and distribution throughout the WSA. The Book Cliffs escarpment would be protected by classifying it for no surface occupancy. Overall, there would be a major adverse impact to the visual resources over the long term.

Impacts on Utility Rights-of-Way. Future pipelines would be able to be routed inside the WSA boundary. Less surface damage would result from being able to align future pipelines along the base slopes on Demaree Canyon WSA's western boundary. This is considered a minor beneficial impact over the long term.



Figure I-20. Maximum Wilderness Alternative, Demaree Canyon Wilderness Study Area.

Issue/Resource Impacts Specific to WSAs

LITTLE BOOK CLIFFS

No Action and No Wilderness Alternatives Impacts

Under these alternatives, the entire WSA (26,525 acres) would be recommended nonsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation of the Little Book Cliffs WSA would result in the loss of wilderness values including some of the special features of the area. Nondesignation would prevent this representative area of the Book Cliffs from expanding the diversity of the National Wilderness Preservation System. The WSA is part of the Colorado Plateau Province and the Book Cliffs area. The value of this ecotype in the Book Cliffs is enhanced by the presence of wild horses.

Impacts from oil, gas and coal development would segment the WSA into parcels smaller than 5,000 acres in size, alter its naturalness and roadlessness, and reduce outstanding opportunities for solitude and primitive and unconfined recreation. Subsidence and possible cracking of the surface could create hazards to recreationists. Thirty-one new wells with associated roads and pipelines would be developed. Coal development would take place on the existing 1,934 acres of coal leases and further leasing would occur on about 6,000 acres in the No Action Alternative (the wild horse range is closed to leasing) and on about 24,000 acres in the No Wilderness Alternative. Coal mining surface facilities for existing leases could be anticipated to be located in Coal Canyon and would impact its natural setting and the horses that concentrate in this canyon.

Special features could be disturbed or lost by mineral development.

Cultural sites and geologic features could be partially lost by surface disturbance. Roads, vehicle traffic and industrial noises and increased motorized use would harass the wild horses.

Overall, the wilderness values of the WSA would be lost due to mineral development. This would be a major adverse impact over the long term, as well as a major adverse impact on the National Wilderness Preservation System by failing to add its wilderness and ecological diversity to the system. Some of the special features of the area and ecological diversity values would also be lost.

Impacts on Coal. The Powderhorn Coal Company has done limited mining on its lease, but this activity has been outside the WSA. No mining has occurred on Mid-Continent's lease except for some exploration that has taken place just outside the WSA boundary. Under this alternative, underground

mining would be expected to occur on the 1,934 acres of pre-FLPMA leases over the long-term. Surface facilities for underground mining would probably be located in the WSA on the south slope of Coal Canyon.

In the No Action alternative, the wild horse range (about 18,000 acres) inside the WSA would be closed to leasing but 6,000 acres could be leased. In the No Wilderness Alternative, about 24,000 acres could be leased for coal including the area inside the wild horse range. Depending on the depth of overburden and mining techniques, some subsidence and possible surface cracking could occur.

Recovery of approximately 269 million short tons of coal from existing and future leases in the No Action Alternative would be a minor beneficial impact in western Colorado over the long term.

Recovery of approximately 349 million short tons from existing and future leases in the No Wilderness Alternative would be considered a moderate beneficial impact to western Colorado over the long term. However, this alternative includes leasing coal in the wild horse range and adjacent to existing leases. If this coal were not available, it could drastically reduce the mine life or impact the economic viability of the existing leases. This could be a moderate adverse impact on the Grand Junction area.

Impacts on Oil and Gas. The WSA is completely leased for oil and gas. Currently, there are two abandoned gas wells, three shut-in wells and eight pending APDs. Oil and gas development would expand progressively throughout the unit over the long term, depending on economic conditions.

BLM estimates there could be 31 new wells, 31 miles of new roads and 18 miles of new pipelines over 20 years which would disrupt 236 acres. See assumption 7 for reclamation considerations in this development. Overall, development of all leases over 20 years would ensure a recovery of this WSA's oil and gas reserves and would be a major beneficial impact.

Impacts on Wild Horses. Mineral development over 20 years would disturb 236 acres in the WSA, with approximately 155 acres (two-thirds) being in the Little Book Cliffs Wild Horse Range. Surface reclamation would help to restore habitat for the horses. Special stipulations would also protect the horse herd during critical winter and foaling periods. Development would transform the range from its present natural setting, which adds significantly to the historic value of the wild horse range, to a more rural landscape of oil wells, roads, pumping stations, and coal mining facilities. Power lines needed

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to run the surface facilities would also disrupt the primitive setting.

Closing new oil and gas roads to the public would help to maintain opportunities for solitude in the WSA. Wild horses have been known to adapt to mineral development in other areas and might do so in this WSA.

Surface coal mining facilities in Coal Canyon on the western most pre-FLPMA coal lease could reduce the horse herd by 10 percent due to loss of critical winter range and foaling area.

Mineral development with protection stipulations would have a minor long term adverse impact on the wild horses and primitive setting of this dedicated range.

Impacts on Recreation. Currently, the majority of the unit is semi-primitive non-motorized. Changes to semi-primitive motorized, roaded natural, and rural would result from mineral impacts. A road network spreading throughout the canyon bottoms and ridge tops would displace outstanding primitive recreation opportunities. The wild horse management plan restricts any new roads in the wild horse range from public use which would help to maintain primitive recreation opportunities. Oil company and coal company use would disrupt opportunities to experience outstanding solitude and outstanding primitive recreation within those portions of the unit where a high level of development might occur. The natural setting for these wild mustangs is held in awe by many because of its historical value and this would be lost over the short term in disturbed areas and in areas from which disturbed landscapes can be viewed. This would be a moderate to major adverse impact over the long term.

Impacts on Visual Resources. Mineral development in this alternative would not be consistent with VRM Class II. Surface disturbance of 236 acres from projected oil and gas development and an unknown quantity of disturbance from coal mining in this WSA would have a long-term impact on this natural landscape. Road cuts and fills would scar the existing natural canyon walls. Reclamation would not be successful in all cases in maintaining an appearance of naturalness (assumption 7). Major alteration of ridges for roadways would have permanent visual impacts on the area. Surface disturbance on the Book Cliffs escarpment would create major long-term visual impacts generally not acceptable to Grand Valley residents who view these cliffs daily. Over the long term, mineral development would result in major adverse impacts on the visual qualities of the WSA.

Impacts on Utility Rights-of-Way. The wild horse plan, which stated that no rights-of-way would cross the wild horse range, was amended to

allow the new Public Service 230 KV line to be routed through Coal Canyon which is inside the wild horse range. Power lines and pipelines would still be permitted outside the horse range but inside the WSA (8,500 acres). This would increase opportunities for utility companies to route a line east to west across the unit. Rights-of-way required to develop pre-FLPMA leases would be granted.

All Wilderness Alternative Impacts

Under this alternative, the entire WSA (26,525 acres) would be recommended preliminarily suitable for wilderness designation.

Impacts on Wilderness. Wilderness designation would protect the area's size, naturalness, roadlessness, and other wilderness values including the continued availability of opportunities to experience outstanding primitive and unconfined recreation and to view and enjoy the area's cultural resources, geologic features, and the wild horse herd. The WSA is representative of the Book Cliffs and the Colorado Plateau which would greatly add to the ecological diversity of the National Wilderness Preservation System. This ecological diversity is enhanced by the presence of a wild horse herd. The Little Book Cliffs Wild Horse Range is the only dedicated horse range in the Colorado Plateau Province. Wilderness designation would protect the range's natural setting and habitat for its 65 to 120 wild horses. This herd is the focus of many of the primitive recreation activities in the WSA. Overall, designation would add a high value, ecologically unique unit to the National Wilderness Preservation System.

However, development of pre-FLPMA oil and gas leases on 85 percent of the unit would create impacts similar to those described under wilderness in the No Action and No Wilderness Alternatives.

Impacts on Coal. Impacts from the existing 1,934 acres of leased coal would be the same as those under the No Action and No Wilderness Alternatives. Wilderness designation could not impede development of pre-FLPMA leases with valid existing rights. However, wilderness designation would withdraw the balance of the WSA (24,591 acres) from leasing, effectively preventing recovery of 324 million short tons of coal. This would be a moderate adverse long-term impact on western Colorado.

Impacts on Oil and Gas. The 3,880 acres of high development potential lands in the seven post-FLPMA leases would not be allowed to be developed if development would impair wilderness values. Wilderness designation would prevent expiring leases from being offered for lease in the

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future. This would result in lost rental income and royalty revenues on such leases. All pre-FLPMA leases on 85 percent of the WSA would be allowed to be developed. BLM estimates there would be 22 oil and gas wells, 22 miles of road and 13 miles of pipeline developed on pre-FLPMA leases over the next 20 years. This would disturb about 152 acres.

Nondevelopment on post-FLPMA leases would be a minor adverse impact over the long term. Development of pre-FLPMA leases would be a moderate to major beneficial impact in the long term.

Impacts on Wild Horses. Wilderness designation would close the wild horse range to future mineral leasing and development, thereby helping to protect the horse habitat and maintaining the primitive setting on the 18,000-acre wild horse range portion of WSA. However, all but about 250 acres of this overlapping area is under pre-FLPMA oil and gas leases. All of the 1,934 acres of pre-FLPMA coal leases also occur in this overlap area. Wilderness management would control motorized recreation use in the wild horse range and prevent harassment of horses. Overall, wilderness designation would have minimal beneficial impact on 18,000 acres of the wild horse range due to pre-FLPMA mineral leases.

Impacts on Recreation. Wilderness designation would not help maintain the semi-primitive non-motorized class or protect the WSA's outstanding opportunities for primitive and unconfined recreation. Oil and gas development (85 percent of WSA) and coal development (11 percent of the WSA) would shift the semi-primitive non-motorized setting toward semi-primitive motorized, roaded natural, and rural. Impacts would be similar to those under the No Action Alternative. The unit's special features, including the horse herd and its natural habitat, would be adversely impacted. Primitive recreation use in the area would probably decline over the long term. Designation could not help maintain outstanding opportunities for primitive recreation in close proximity to the largest population center in western Colorado. Opportunities to view, study and photograph the WSA's wild horses would be maintained, but the primitive setting would change. This would be a moderate adverse impact on primitive recreation in the WSA over the long term.

The WSA would be closed to off-road vehicles (ORVs). This would result in a low adverse impact on ORV enthusiasts who especially enjoy using the Coal Canyon area in the spring because of its low elevation and proximity to Grand Junction. The majority of this off-road vehicle use is along the boundary road in Coal Canyon.

Impacts on Visual Resources. Wilderness designation would not maintain the quality of the WSA's visual resources because 85 percent of the

WSA has pre-FLPMA oil and gas leases. Visual changes in the WSA would not be consistent with visual resource management Class II objectives. Impacts would be similar to those under the No Action Alternative.

Impacts on Utility Rights-of-Way. Wilderness designation would prohibit any new rights-of-way, except those with valid existing rights, from being located within the WSA. Future utility lines would have to be routed around the area. Rights-of-way required to develop pre-FLPMA leases would be granted.

Maximum Wilderness Alternative Impacts

Under this alternative, an expanded WSA acreage of 28,600 acres would be recommended preliminarily suitable for wilderness designation (Fig. 1-21).

Impacts on Wilderness. Impacts would be similar to those described under the All Wilderness Alternative except 2,075 additional acres would be designated. In this additional area, approximately 1,500 acres have pre-FLPMA oil and gas leases. This includes lands in the Round Mountain area and inside the cherry-stemmed road to Monument Rocks. Adding these areas would block up the WSA and enhance wilderness values by preventing ORV use and other nonconforming uses in these cherry-stemmed roads which penetrate a mile or more inside the WSA. Rehabilitation of roads and treatment of the Round Mountain chainings would add to the naturalness of the WSA. When pre-FLPMA leases are considered, the impacts from oil and gas development would be similar to those described in the No Action Alternative except about 4,380 acres (15 percent of the WSA) would not be developed, and additional coal leasing would not take place.

Impacts on Coal. Impacts would be the same as those discussed in the All Wilderness Alternative, except a slightly larger area would not be available for leasing.

Impacts on Oil and Gas. Impacts would be the same as those under the All Wilderness Alternative except approximately 2,575 acres of additional pre-FLPMA oil and gas leases would be included in the area. Impacts would increase accordingly.

Impacts on Wild Horses. Impacts on wild horses would be the same as those under the All Wilderness Alternative except closing the Monument Rock cherry-stemmed road and adding it into the WSA would improve the summer range of the wild horses. Vehicles would not disturb the horses in the Monument Rocks area, and non-motorized

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access would generally decrease the number of recreationists using the summer range.

Impacts on Recreation. Recreation impacts would be similar to those described under the All Wilderness Alternative except the semi-primitive non-motorized setting would be shifted to semi-primitive motorized, roaded natural, and rural from additional surface disturbance. Existing roads in both additions to the WSA would no longer be available for motorized use. Roads and other surface impacts would be constructed for oil and gas and coal development on pre-FLPMA leases. Approximately 100 visitor days of road oriented ORV use would be further lost by including the Monument Rocks and Round Mountain areas in this alternative.

Impacts on Visual Resources. Impacts in this alternative are similar to those described in the All Wilderness Alternative except the described visual impacts would extend onto an additional 2,575 acres.

Impacts on Utility Rights-of-Way. New rights-of-way, which do not have valid existing rights, would not be permitted in any part of the WSA (28,600 acres). Future rights-of-way would have to be routed around this WSA.

Manageability Alternative Impacts

Under this alternative, the entire WSA (26,525 acres) would be recommended unsuitable for wilderness.

Wilderness values in this WSA would not receive statutory protection as a designated wilderness area. Development of pre-FLPMA leases would take place regardless of wilderness designation. Because of their dominance throughout the WSA (Fig. I-7), development would significantly impair the wilderness characteristics of the area.

These pre-FLPMA leases, which are held by production within or adjacent to the WSA, adversely affect BLM's ability to manage the area as wilderness in the long term. Because of their wide spread distribution, making boundary adjustments to improve manageability is unworkable. Maintenance of wilderness values cannot reasonably be assured, and therefore the unit is not manageable for wilderness.

Preferred Alternative Impacts

Under this alternative the entire WSA (26,525 acres) would be recommended unsuitable for wilderness.

Impacts on Wilderness. Pre-FLPMA leases on 85 percent of the WSA prevents the unit from being manageable for wilderness. Impacts on wilderness values and diversity as discussed in the wilderness section of the No Action Alternative would also apply to this alternative. Overall, this would be a major adverse impact on wilderness values over the long term. Failure to add this unit to the National Wilderness Preservation System would be a major adverse impact by not permanently protecting its wilderness values and ecological diversity in the system.

Impacts on Coal. Development of the two existing coal leases (1,934 acres) and further leasing of 24,591 acres in the unit in this alternative would provide maximum opportunity to recover the estimated reserve of 349 million short tons in this portion of the Book Cliffs potential coal development area. This is a moderate beneficial impact on coal over the long term.

Impacts on Oil and Gas. Opportunity to develop all the leases in this WSA, including 7 post-FLPMA leases (3,880 acres), would maximize the recovery of the oil and gas reserve. This would be a major beneficial impact over the long term.

Impacts on Wild Horses. Maximum development of minerals would produce some adverse impacts on the wild horse herd and its primitive habitat in this WSA. Overall, mineral development would have a minor adverse impact on wild horses.

Impacts on Recreation. Increased road development associated with mineral development in this WSA's semi-primitive non-motorized setting of about 8,500 acres would shift to more developed, motorized settings (semi-primitive motorized, roaded natural, and rural). Outstanding primitive recreation opportunities would be lost over the long term. This shift of settings would occur to a lesser degree on that part of the WSA in the wild horse range because of the natural and scenic values stipulations (see Appendix E). Opportunities to view wild horses in a primitive setting could be lost. Mineral development might reduce opportunities to view and photograph wild horses. These changes in recreation settings and opportunities would be a moderate adverse impact over the long term.

Impacts on Visual Resources. Development of mineral leases would result in a moderate to high amount of surface disturbance outside the wild horse range and a low to moderate amount inside. The scenic and natural value stipulation for oil and gas (see Appendix E) would help to maintain a natural landscape in the horse range and therefore lessen visual contrasts in the wild horse range. The major problem with surface disturbance in this WSA from its projected 22 pre-FLPMA wells and roads is

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that any cuts on steep slopes would be long-term visual scars due to difficulties in recontouring and revegetating.

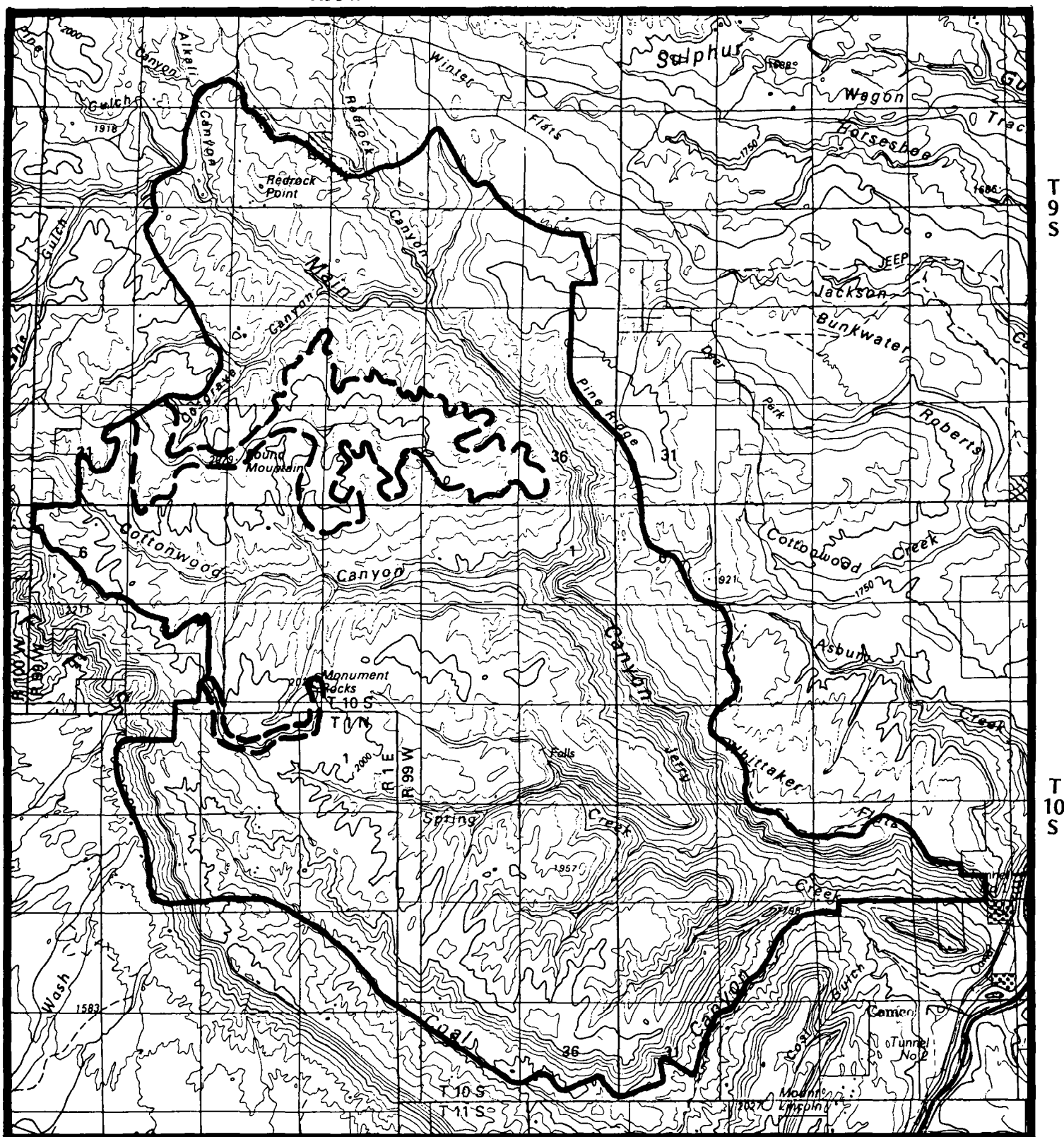
The existing coal leases along Coal Canyon would probably create a moderate to high degree of surface disturbance in the canyon from at least one mine entrance, an access road and a power line. Further coal leasing in the WSA would introduce localized disturbed landscapes linked by access roads and power lines. Coal exploration activity including roads would spread throughout the WSA over the long term. Overall, coal development would create medium to high visual contrasts in the WSA.

Surface disturbance as described above would be inconsistent with VRM Class II objectives except in the Book Cliffs escarpment which would be protected by a no surface occupancy stipulation. This

would require a reclassification to VRM Class IV and represents a major change from the WSA's current visual landscape. Overall, there would be major adverse impacts to visual resources in the entire WSA over the long term.

Impacts on Utility Rights-of-Way. Future rights-of-way would be allowed to cross this WSA. The wild horse range part of the WSA is classified sensitive. A sensitivity classification requires that special efforts be made in the planning designing and constructing of a right-of-way to protect the sensitive resource, which in this situation is the wild horse herd and habitat.

Opportunities to route new rights-of-way through this WSA would increase cost savings to industry and utility companies and provide more latitude in route planning. This would also be a minor beneficial impact over the long term.



1 1/2 0 1 2 3 Miles



LEGEND

- Alternative Boundary
- - - WSA Boundary

Figure I-21. Maximum Wilderness Alternative, Little Book Cliffs Wilderness Study Area.

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BLACK RIDGE CANYONS WSA

No Action Alternative Impacts

Under this alternative the entire Black Ridge Canyons WSA (18,150 acres) would be recommended nonsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation of this WSA would prevent long-term protection of the unit's very high wilderness values by not adding it to the National Wilderness Preservation System. Under this alternative, the unit would be managed as recreation lands, to preserve and enhance recreation values, which would generally protect the area from surface disturbance and preserve opportunities for outstanding solitude and outstanding primitive recreation in the short term. Protection of the WSA would come from withdrawing it from mineral location, closing it to mineral leasing and designating it unsuitable for timber harvesting. Vehicle travel would be limited to existing roads and trails. Vegetation manipulation for wildlife, although affecting only a small acreage, could impact the naturalness of the unit. Some impacts to outstanding opportunities for solitude would result from this ORV designation. These management actions would be effective for the life of the resource management plan, 15 to 20 years, if this alternative was selected. However, future resource management plan revisions could impact wilderness values.

The unit is part of the Colorado Plateau Province and forms the northern terminus of the Uncompahgre Plateau. Nondesignation would not allow this unit to expand the diversity of the National Wilderness Preservation System. This unit's canyons have the same general characteristics as the adjacent Colorado National Monument, a unit of the National Park Service. Hikers to the unit commonly compare the spectacular canyons on Black Ridge to those in Canyonlands National Park in Utah. The units' naturalness, geologic and cultural features, and outstanding scenery would make the unit an outstanding representative of the Colorado Plateau for the National Wilderness Preservation System.

All special features in the unit could be degraded over the long term by not adding the unit to the National Wilderness Preservation System. Special features present include threatened and endangered species and paleontological values. Its close proximity to Grand Junction would have also been an added value for wilderness designation.

Overall, nondesignation would be a major adverse long-term impact, based on the impact of not adding such an outstanding unit to the National Wilderness Preservation System. However, under this alternative, the threat to wilderness values would

be low in the short term and uncertain in the long term.

Impacts on Wildlife. Under this alternative, suitable habitat would be provided for bighorn sheep. Vegetative treatment, up to 300 acres, and water developments would enhance bighorn sheep habitat. However, timber harvesting, that would have benefited wildlife, would not be carried out and would be a minor adverse impact to wildlife over the long term.

Impacts on Recreation. Recreation opportunity spectrum classes would remain static over the short term although continued motorized use would begin to shift primitive and semi-primitive non-motorized classes to semi-primitive motorized over the long term. There would be low to moderate impacts to recreation over the long term.

Impacts on Off-Road Vehicles (ORV). Off-road vehicle use would be limited to existing roads and trails in the short term, but the existing road system might expand over the long term. Effective ORV management would slow this expansion. In the process, ORV opportunities would be expanded throughout the unit.

Impacts on Transportation. This alternative provides for the continued use of the existing roads and trails, therefore minimal impacts would occur. No provision is made in this alternative to acquire legal access to Devil's, Flume or Pollock Canyons and access would continue to be restricted in the northeast quadrant. Trespass onto private property from recreationists would probably continue in this area.

Impacts on Utility Rights-of-Way. The entire area would be designated unsuitable for utilities. No provision would be made for future power, phone, or water lines between Glade Park and Fruita. Opportunity to move the Fruita water line outside the Colorado National Monument would be lost. The lack of a north-south corridor to serve local communities would be a major adverse impact over the long term.

No Wilderness Alternative Impacts

Under this alternative the Black Ridge Canyons WSA (18,150 acres) would be recommended nonsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation of Black Ridge Canyons WSA would result in the loss of the units' wilderness values and the failure to expand the diversity of the National Wilderness Preservation System. The units' wilderness and ecological diversity are highlighted in the No Action Alternative.

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Loss of the units' naturalness would result from timber harvesting (about 1,974 acres of productive pinyon-juniper), vegetation manipulation (up to 300 acres) for enhancing wildlife habitat, and surface-disturbing activities associated with oil and gas leasing and development and mineral location. The probability of mineral development is low and consequently impacts would probably be low. Off-road vehicle use would be limited to existing roads and trails except in the Devil's-Flume-Pollock Canyon area where the use would be limited to designated routes. Outstanding opportunities to experience solitude would be impacted by off-road vehicles and from any mechanized activities that would be associated with timber harvest, vegetative treatments, and mineral development. Outstanding opportunities for primitive and unconfined recreation would also be impacted by these activities including some modification of natural landscapes. Overall, the loss of wilderness values and wilderness diversity would be a major long-term impact.

Impacts on Wildlife. Under this alternative, the major management emphasis would be to maintain and improve wildlife habitat. This would include habitat for bighorn sheep, deer and wild turkey. Vegetation manipulation and water developments would be two primary techniques that would be used. Forestry would also be emphasized along the southern edge of the unit, but restricted to practices that would benefit wildlife. Riparian habitat would also be maintained through management emphasis. Overall, this alternative would have a major beneficial impact on wildlife and wildlife habitat over the long term.

Impacts on Recreation. The major recreation opportunity spectrum setting in this unit is semi-primitive non-motorized. Surface-disturbing activities together with increasing trail-oriented ORV use would shift much of the upper bench areas to semi-primitive motorized. Recreation opportunity spectrum classes in the canyons would not be anticipated to change.

The unit would be managed as an intensive recreation management area for backcountry recreation and trail-oriented off-road vehicle use. In the short term, motorized vehicle use to the arches of Rattlesnake Canyon would continue to be the major use of the area with some primitive recreation (mainly hiking) occurring in the canyons and on the Ute Trail, which also provides access to the arches. Over the long term, other trails could be added to a trail system for off-road vehicle enthusiasts due to increased demand. Trails at the mouths of Pollock, Devil's and Flume Canyons and on the upper benches would have their naturalness and primitive recreation opportunities diminished.

Overall, primitive recreation experiences would be limited to the canyons. Off-road vehicle opportunities would spread throughout the WSA. The loss of outstanding primitive recreation opportunities outside the canyons, over the long term, would be a major adverse impact. Also, there would be a minor beneficial impact for motorized use in this alternative.

Impacts on Off-Road Vehicles. Off-road vehicles were discussed under the Recreation section.

Impacts on Transportation. Impacts on transportation would be minimal in this alternative. Acquisition of legal access and a trailhead at Pollock Canyon would greatly enhance access into the area.

Impacts on Utility Rights-of-Way. Under this alternative, the unit would be classified as sensitive to public utilities. This means water, telephone and small power lines could be constructed along the western edge of the area if resource value would be protected. This would help provide utilities to people living in Glade Park and an alternate route for the Fruita water line. Providing this utility corridor would be considered a major long term beneficial impact.

All Wilderness Alternative Impacts

Under this alternative the entire Black Ridge Canyons WSA (18,150 acres) would be recommended preliminarily suitable for wilderness designation.

Impacts on Wilderness. Wilderness designation would permanently maintain the unit's high quality wilderness values and would expand the diversity of the National Wilderness Preservation System by adding an outstanding representative of the Colorado Plateau ecotype. Representation from the Colorado Plateau is minimal in the National Wilderness Preservation System at this time. The pristine naturalness of the four major and several minor canyon systems would be maintained by designation, as would opportunities to experience outstanding solitude and outstanding primitive recreation. Threatened and endangered plants and animals, outstanding scenery, spectacular geologic features like the arches in Rattlesnake Canyon, and cultural and paleontological values would also be protected under this alternative. Designation of this high value WSA would be a major long-term, beneficial impact to the National Wilderness Preservation System.

Impacts on Wildlife. Wilderness designation would constrain how vegetation would be manipulated and how water projects would be developed. BLM's *Wilderness Management Policy* provides that vegetation manipulations in designated wilderness may be approved by the BLM Colorado State

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Director on a project by project basis if it does not degrade wilderness character. Wildfire, or prescribed burning, may be used as a wildlife management tool for this purpose. Water developments may also be located in BLM designated wilderness if it is determined they are needed for maintenance of wildlife populations and are compatible with preservation of wilderness character.

Assuming projects would meet the criteria for being compatible with wilderness values, there would be a moderate beneficial impact on wildlife in this alternative.

Impacts on Recreation. Recreation opportunity spectrum settings would be maintained. The area would be closed to off-road vehicles except for the existing boundary roads and cherry-stemmed roads. Motorized access would still be available to within one mile of the arches in Rattlesnake Canyon. Primitive recreation opportunities would be enhanced by off-road vehicle closures. Recreation use in the long term could increase at an accelerated rate of up to 10 to 15 percent annually. This would be due in part to wilderness designation in combination with the WSA's regional reputation. Designation would be a major long-term beneficial impact for primitive recreation and a minor long-term adverse impact for off-road vehicle users.

Impacts on Off-Road Vehicles. Impacts are described under the Recreation section.

Impacts on Transportation. Under this alternative, all existing roads would be outside the unit boundaries. Legal access would be obtained and a trailhead developed at Pollock Canyon. There would be minimal impacts to transportation.

Impacts on Utility Rights-of-Way. The WSA would be unsuitable for utility rights-of-way. Impacts would be the same as those described under the No Action Alternative, and would have a moderate adverse impact over the long term.

Maximum Wilderness Alternative Impacts

Under this alternative, an expanded WSA acreage of 20,185 acres would be recommended preliminarily suitable for wilderness designation.

Impacts on Wilderness. Impacts would be similar to those described under the All Wilderness Alternative except three cherry-stemmed roads and a triangular parcel of land would be added on to the unit. Similar types of boundary adjustments to enhance manageability in the Black Ridge Canyons West unit would result in the two WSAs becoming one unit (Fig. I-22). For the purposes of analysis, impacts are being described as though the units are separate.

The removal of cherry-stemmed roads would enhance opportunities to experience outstanding solitude throughout the unit. The triangular parcel of land, which includes 3 miles of the Colorado Ridge Road, would be added into the WSA, as it is an integral part of the unit's plateau landform between Bull Canyon and Mee Canyon. The parcel was originally excluded from the WSA because it was less than 5,000 acres, and was separated from the Black Ridge Canyons WSAs by the Y in the Colorado Ridge Road. Wilderness protection on this triangular parcel would be a major addition to the WSA's wilderness values, especially its naturalness and outstanding opportunities for primitive and unconfined recreation. Hikers would not be forced to hike out of wilderness for one and one-half miles and then reenter it again. This would prevent disruption of the wilderness experience. Designation would be a major long-term beneficial impact for wilderness values.

Impacts on Wildlife. Impacts would be the same as those discussed under the All Wilderness Alternative.

Impacts on Recreation. Impacts would be similar to those under the All Wilderness Alternative for primitive recreation. Primitive recreational opportunities would be enhanced by adding in the triangular parcel and joining the Black Ridge Canyons and Black Ridge Canyons West units. Opportunities to hike east and west throughout the Black Ridge area would be enhanced by one designated wilderness area.

Closing the area to off-road vehicle use and closing that part of the Colorado Ridge Road and the Ute Trail to motorized vehicles have a moderate adverse impact in the long term. Many recreationists (approximately 2,000) from the region, especially the Grand Valley, travel by vehicle to the arches each year. Currently, an emergency off-road vehicle closure forces a 1-mile hike from the newly established Ute Trail trailhead (at a point from where road is closed). Closing the Ute Trail road would add approximately 2 miles onto this hike. The closest alternate for viewing natural arches is a 2-hour drive at Arches National Park in Utah. Under this alternative, recreationists not wanting to view a concentration area of arches but wanting to hike 3 miles would be forced to go to Arches National Park. This alternative would also force off-road vehicle users to seek other areas.

Impacts on Transportation. Under this alternative, approximately 7 miles of roads would be closed in this WSA. The Devil's Canyon, Pollock Canyon and Ute Trail roads would be added into the WSA as would the Colorado Bench Road on the east side of the Y (Fig. I-22).

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As described in the Recreation section, use of these roads is minimal except for motorized access to Rattlesnake Canyon and for grazing administration. Once these roads are closed, recreationists wishing to visit arches would have to hike into Rattlesnake Canyon or drive to Arches National Park near Moab, Utah (a 2-hour drive from Grand Junction). Hiking to the arches would be from the Pollock Canyon area or from the Ute Trailhead (Fig. 1-22).

Overall impact to closing motorized recreation use in this unit would be considered a major adverse impact in the short term and a minor adverse impact in the long term. It would be anticipated that the motorized recreationists using this area would react strongly to closing motorized access to the arches but would find other areas and reluctantly accept this closure over the long term. Ranchers and private landowners would be required to follow the minimum tool concept to be allowed motorized use of these 7 miles of road. Some activities would allow grazing operators continued use of these roads.

Impacts on Utility Rights-of-Way. Utility location would be classified unsuitable in this WSA. Impacts would be similar to those described under the No Action Alternative. The lack of an opportunity to locate utilities within the area would be a major adverse impact over the long term to the rural communities.

Manageability Alternative Impacts

Under this alternative a portion of the expanded WSA (19,595 acres) would be recommended preliminarily suitable for wilderness designation. Black Ridge Canyons WSA and Black Ridge Canyons West WSA would be merged into one unit (Fig. 1-23).

Impacts on Wilderness. Environmental impacts would be similar to those described in the All Wilderness and Maximum Wilderness Alternatives. Under this alternative, a one-quarter mile wide, small utility corridor would be designated along the eastern boundary. In addition, about 4 miles of roads would be designated as limited to off-road vehicle use to allow vehicle access within 1 mile of the arches in Rattlesnake Canyon. This expanded motorized use would have a minor adverse impact on outstanding opportunities for solitude and primitive and unconfined recreation in the unit.

Approximately 2 miles of the northern boundary of the WSA would be relocated from the north shore to the south shore of the Colorado River. This boundary change would have a minimal impact on the wilderness values since its on the extreme boundary of the unit. Excluding motorized river use

from this WSA along its northern boundary would make it more manageable for wilderness.

There would be minor impact to wilderness values by adding back in motorized access for the arches. The utility corridor would have minor impact on wilderness provided utility lines were designed and constructed to protect natural and scenic values in this sensitive area between the Colorado National Monument and a designated wilderness.

Overall, wilderness designation would be a major long-term beneficial impact as it would protect the WSA's high quality wilderness values and greatly add to the National Wilderness Preservation System.

Impacts on Wildlife. Impacts on wildlife would be the same as those described under the All Wilderness Alternative. Overall, wilderness designation would have very minor adverse impacts on wildlife habitat over the long term. There would also be moderate beneficial impacts to wildlife over the long term.

Impacts on Recreation. Under this alternative, recreation opportunity spectrum settings and related primitive recreation opportunities would be maintained, or actually enhanced, by closing cherry-stemmed roads and adding the triangular piece of land near Horsethief Canyon to the unit.

Impacts to off-road vehicles and motorized recreation would be similar to the impacts described in the Maximum Wilderness Alternative. Motorized access would be maintained to within 1 mile of the arches in Rattlesnake Canyon. Historically, motorized use to Rattlesnake Canyon area has been primarily to view the arches. The remainder of the expanded WSA would be closed to ORVs.

Including 2 miles of the Colorado River under the All Wilderness and Maximum Wilderness Alternatives would create a conflict with motorized boats in Horsethief and Ruby Canyons. This alternative would move the boundary from the north shore to the south shore of the river, thereby resolving the conflict. This would allow continued motorized boat use (about 2,000 visitor days) for waterfowl hunting, fishing and recreational boating. Motorized boats would be allowed to land on the south shore boundary. Providing for this motorized boating use would be a minor adverse impact but would be very important in enhancing wilderness manageability in the WSA. Overall, wilderness designation would provide major beneficial impacts to recreation. There would be minor adverse impacts to motorized vehicles over the long term.

Impacts on Off-Road Vehicles. Off-road vehicle impacts were discussed under the Recreation Section.

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Impacts on Transportation. Impacts would be similar to those discussed in the Maximum Wilderness Alternative. Under this alternative, four miles of the Ute Indian Trail road would be classified as limited to allow motorized access to within 1 mile of the arches in Rattlesnake Canyon. Providing this road would be a major beneficial impact in the long term. Other road closures would be considered a minor adverse impact over the short and long term.

Impacts on Utility Rights-of-Way. Impacts would be the same as those discussed under the No Wilderness Alternative. Providing a utility corridor on the east side of the unit would have a minor long term beneficial impact. Overall there would be a low adverse impact on utility rights-of-way.

Preferred Alternative Impacts

Under this alternative a portion of the WSA and some adjacent public lands (19,595 acres) would be recommended preliminarily suitable for wilderness designation (Fig. I-24).

The Manageability Alternative was selected as the Preferred Alternative; therefore, environmental impacts would be the same. The Black Ridge Canyons WSA and Black Ridge Canyons West WSA would be combined into one unit for wilderness consideration by Congress.

Issue/Resource Impacts Specific to WSAs

BLACK RIDGE CANYONS WEST WSA

No Action Alternative Impacts

Under this alternative the entire Black Ridge Canyons West WSA (54,290 acres) would be recommended unsuitable for wilderness designation.

Impacts on Wilderness. The description of impacts for this alternative in the Black Ridge Canyons analysis would also apply here. The threat to paleontological resources in this unit from nondesignation would possibly impact the angiosperm fossil site in this unit. This site is reported to have produced the world's oldest fossil flower.

Impacts on Forestry. Approximately 7,435 acres of productive pinyon-juniper woodland would be designated as unsuitable for management and harvesting due to recreation recommendations. These are marginal stands with a productivity of 6-10 cords per acre. Based on the acreage of pinyon-juniper in the Grand Junction Resource Area, this would be a minor adverse impact in the long term.

Impacts on Wildlife. Wildlife impacts would be similar to those discussed under the Black Ridge Canyons analysis. However, two vegetation treatments would benefit bighorn sheep in this unit. Under this alternative, there would be a minor adverse impact to wildlife over the long term.

Impacts on Recreation. Recreation impacts would be similar to those described under this alternative for Black Ridge Canyons WSA. There would be low to moderate adverse impacts over the long term.

Impacts on Off-Road Vehicles. Impacts would be the same as those described under the No Action Alternative for Black Ridge Canyons WSA.

Impacts on Transportation. This alternative provides for continued use of existing roads and trails; resulting in no impact to transportation. Trespass onto private land from the Colorado Bench Road would continue.

No Wilderness Alternative Impacts

Under this alternative the Black Ridge Canyons West WSA (54,290 acres) would be recommended as unsuitable for wilderness designation.

Impacts on Wilderness. Impacts from nondesignation are similar to those discussed under the No Wilderness Alternative for Black Ridge Canyons WSA. More acres of surface disturbing impacts on wilderness values would occur in this unit than in the adjacent WSA from management and harvesting of productive pinyon-juniper woodlands (6,198

acres) and vegetation manipulation (up to 300 acres) of pinyon-juniper and mountain shrub. Overall, the loss of wilderness values and wilderness diversity would be a major long term impact.

Impacts on Wildlife. Under this alternative, the positive impacts on wildlife would be the same as described under the No Wilderness Alternative for Black Ridge Canyons WSA.

Impacts on Recreation. The impacts described under the Black Ridge Canyons WSA generally apply to this unit. The only exception is that motorized travel occurring in this unit would be primarily focused on sightseeing, fishing (Colorado River), and rockhounding.

This unit also contains a large percentage of recreation opportunity spectrum class primitive centered from Mee Canyon west (Fig. I-10). Surface disturbance and off-road vehicle use in this area would shift much of this area to semi-primitive motorized. The very limited off-road vehicle use in this area would be projected to increase substantially over the long term. The loss of primitive recreation opportunities outside the canyons, over the long term, would be a major adverse impact.

Impacts to Off-Road Vehicles. Off-road vehicle impacts were discussed in the Recreation Impact section. See Recreation section for Black Ridge Canyons WSA for the same alternative. There would be a minor to moderate beneficial impact to motorized recreation in this alternative.

Impacts to Transportation. Under this alternative there would be minimal impacts. Some trespass would continue along the Colorado River from recreationists using the Colorado Ridge Road.

All Wilderness Alternative Impacts

Under this alternative the entire Black Ridge Canyons West WSA (54,290 acres) would be recommended preliminarily suitable for wilderness designation.

Impacts on Wilderness. The impacts from this alternative would be similar to those described for Black Ridge Canyons WSA. This unit contains three extensive canyons (Knowles Canyon alone contains over 21 miles of main and side canyons), several lesser canyons and a variety of bench lands, ridges and mesas. Designation of this high value WSA would be a major long term beneficial impact to the National Wilderness Preservation System.

Impacts on Wildlife. The impacts from this alternative are the same as those described for Black Ridge Canyons WSA. Proposed vegetative treatments, up to 300 acres, would have to be sited and designed to be consistent with the *Wilderness Man-*

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agement Policy. Assuming some habitat treatment could be done, there would be a moderate long term beneficial impact to wildlife.

Impacts on Recreation. Recreational impacts in this alternative would be similar to those described for Black Ridge Canyons WSA. The dominant recreation opportunity spectrum class in this unit is primitive. This alternative would maintain that class which is represented on less than 3 percent of the lands in the Grand Junction Resource Area. Designation would be a major long term beneficial impact for primitive recreation.

Off-road vehicle use is minimal in this unit and therefore off-road vehicle closure would have a minor adverse impact in the long term. Off-road vehicle use would still occur on boundary roads and on the cherry-stemmed road on Knowles Canyon Bench.

Impacts on Off-Road Vehicles. Off-road vehicle impacts are described under the Recreation section.

Impacts on Transportation. Under this alternative, all existing roads would be maintained and open to vehicle use. Trailheads would be developed for Mee, Knowles and Jones Canyons. Private property trespass problems would still occur along the Colorado River from recreationists using the Colorado Ridge Road.

Maximum Wilderness Alternative Impacts

Under this alternative, an expanded WSA acreage of 55,015 acres would be recommended preliminarily suitable for wilderness designation (Fig. I-22).

Impacts on Wilderness. Impacts would be similar to those described under the All Wilderness Alternative for Black Ridge Canyons WSA. Additions to this unit would merge it with Black Ridge Canyons. Additions to enhance wilderness manageability include the Colorado Ridge Road (10 miles), Ute Trail Road (1 mile), the Knowles Canyon Bench Road (6 miles) and a parcel of public land south of Mee Canyon that had been separated from the WSA by another 4-wheel drive boundary road. Closing this latter road would reduce trespass onto private land to the south. It would also increase the unit's manageability by preventing off-road vehicle use from occurring on the benches above Mee and Knowles Canyons. Designating this area as wilderness would be a major long term beneficial impact on the National Wilderness Preservation System.

Impacts on Forestry. Impacts would be similar to those described under the No Action Alternative. A total of 7,711 acres of pinyon-juniper woodlands would be forgone for future management and use.

This would be a minor adverse impact in the long-term because the productivity of these stands is marginal and an abundant supply of pinyon-juniper occurs in the region.

Impacts on Wildlife. Impacts would be similar to those described under the All Wilderness Alternative.

Impacts on Recreation. Impacts would be the same as those described under the All Wilderness Alternative. Primitive recreation opportunities would be enhanced by adding the Colorado Ridge, Ute Trail and Knowles Canyon Bench Roads back into the unit.

Off-road vehicle use would not be permitted in the WSA. Motorized access to the Colorado River would no longer be allowed, except for permitted use. This minimal motorized use would be displaced into other areas.

Impacts on Off-Road Vehicles. Off-road vehicle impacts are discussed under the Recreation section.

Impacts on Transportation. Under this alternative, approximately 23 miles of roads, including the Colorado Ridge Road (including left side of the Y), the Ute Trail road, the Knowles Canyon Bench Road and the boundary road in the area of Twenty-eight Hole would be closed to vehicle use.

Current motorized recreation use on all these roads is minimal (less than 1,000 visitor days/year). The road into Twenty-eight Hole has created trespass problems onto private lands. Closing the roads would be considered a minor adverse impact in the short and long term. However, some use of the road would be used for grazing administration in accordance with BLM's *Wilderness Management Policy*.

Manageability Alternative Impacts

A portion of the expanded WSA (47,907 acres) would be recommended preliminarily suitable for wilderness. Black Ridge Canyons West WSA and Black Ridge Canyons WSA would be merged into one unit (Fig. I-23).

Impacts on Wilderness. Impacts would be similar to those described under the All Wilderness and Maximum Wilderness Alternatives. Three extensive canyon systems (over 57 miles in total length including side canyons), the intervening mesas, together with their associated wilderness values and special features would be protected over the long term. Ecological diversity in the National Wilderness Preservation System would be increased substantially.

Issue/Resource Impacts Specific to WSAs

Seven miles of the northern boundary would be moved from its present location along the railroad right-of-way on the north shore to the south shore line of the Colorado River. This boundary change would have a minimal impact on wilderness values since it is on the edge of the unit.

Impacts on Forestry. To resolve a conflict with forestry, 6,435 acres (Fig. I-11) of productive pinyon-juniper woodlands would be excluded from the unit (Fig. I-23). Making this woodland acreage available for management and harvest would be a minor beneficial impact over the long term.

Impacts on Wildlife. Impacts on wildlife would be the same as those discussed in the All Wilderness Alternative.

Impacts on Recreation. Impacts are similar to those described under this alternative for Black Ridge Canyons WSA except the entire unit would be closed to off-road vehicles. The northern boundary would be modified to allow motor boats to continue to use Ruby Canyon.

The amount of hiking use would be expected to increase substantially because of its superlative recreation opportunities being publicized through word of mouth and by the region's newspapers. The annual increase would be projected to be 10 to 15 percent over the current use level of about 1,000 visitor days.

Impacts on Off-Road Vehicles. Impacts would be similar to those discussed in the Maximum Wilderness Alternative. Road closures would be considered a moderate adverse impact over the short and long term.

Impacts to Transportation. Impacts would be the same as those described under the Maximum Wilderness Alternative.

Preferred Alternative Impacts

A portion of the WSA and some adjacent public land (54,342 acres) would be recommended preliminarily suitable for wilderness designation (Fig. I-24).

The Manageability Alternative was selected as the Preferred Alternative; therefore, environmental impacts would be the same except for the impact on forestry. The Black Ridge Canyons West WSA and Black Ridge Canyons WSA would be combined into one unit for wilderness consideration by Congress.

Impacts on Forestry. The 7,435 acres of productive pinyon-juniper woodland in this WSA would be classified unsuitable for management and harvest. This loss would be a minor adverse impact on forestry over the long term.

THE PALISADE WSA

No Action Alternative Impacts

Under this alternative all of The Palisade WSA (26,050 acres) would be recommended unsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation of this WSA would result in a loss of wilderness values including naturalness, outstanding opportunities for solitude, outstanding opportunities for primitive and unconfined recreation, and special features including geologic features and outstanding scenery. This unique area, with its ancient meander neck and extremes of diversity (4,000 feet difference in elevation with associated flora and fauna), would not be added as a representative ecotype of the Colorado Plateau to the National Wilderness Preservation System.

Although the area would be managed as a wildland to protect its recreation and scenic values, wilderness values over the long term would still be impacted because of off-road vehicle activity, mining, oil and gas development (low potential), mineral sales, and timber harvesting. The scenic quality of the rocky spine called The Palisade would probably be maintained. Surface disturbance from off-road vehicles would result from the trails being expanded. Overall, loss of wilderness values would be a moderate adverse impact in the short term, but a major adverse impact in the long term. Failure to expand the ecological diversity of the National Wilderness Preservation System with this unit would be a moderate to major adverse impact.

Impacts on Locatable Minerals. Under this alternative, the area would be open to locatable minerals. Generally, there would be no constraints on developing these minerals which are considered to have low potential. There would be no impacts on locatable minerals.

Impacts on Oil and Gas. The Palisade itself, about 2,803 acres, would be restricted to no surface occupancy for leasing. The remainder of the area is unassigned to a leasing category until a lease is proposed and further environmental analysis is completed. The exception to this is a pre-FLPMA oil and gas lease of 120 acres located in the northern part of the unit east of North Fork (Fig. I-14, Chap. 3). Generally, there would be no impact from this alternative on oil and gas.

Impacts on Forestry. Approximately 1,654 acres of productive pinyon-juniper woodlands on the east side of the unit would be identified unsuitable for management and harvesting. Based on the supply

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of pinyon-juniper in the resource area, this would be a minor adverse impact over the long term.

Impacts on Recreation. Under this alternative, management of the area as a wildland area would tend to maintain the recreation opportunity spectrum settings primarily as semi-primitive non-motorized in the short term, but this would shift to semi-primitive motorized in the long term. Off-road vehicle use of the area would be projected to continue to grow (off-road vehicle users include enthusiasts from throughout west central Colorado) over the long term. Nondesignation of this unit would be a major adverse impact on primitive recreation over the long term.

No Wilderness Alternative Impacts

Under this alternative all of The Palisade WSA (26,050 acres) would be recommended nonsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation would result in the loss of wilderness values and failure to expand the diversity of the National Wilderness Preservation System. These values were highlighted in the No Action Alternative.

This alternative places management emphasis on developing the resources of the WSA. The unit would be leased for oil and gas, managed for productive pinyon-juniper (1,654 acres), opened for mineral location and mineral material sales, and opened to off-road vehicles. Recreation use would be promoted. The resulting surface disturbance would result in the loss of naturalness and possibly some special features. Motorized use of the area would negate outstanding opportunities for solitude and limit outstanding opportunities for primitive recreation. New roads from oil and gas exploration and development would segment the WSA into smaller parcels disrupting naturalness. Overall, loss of wilderness values would be a major adverse impact over the long term.

Impacts on Locatable Minerals. Under this alternative, the area would be open to mineral location. Development would be encouraged. There would be no impact on locatable minerals.

Impacts on Oil and Gas. The entire area would be open for oil and gas leasing and development. This alternative would not constrain development in this low potential area. There would be no impacts on oil and gas development.

Impacts on Forestry. Seven hundred ninety-seven acres (857 acres eliminated due to adverse location) of productive pinyon-juniper woodlands would be available for management and harvest. Overall impact of management of these woodlands

for production is considered a moderate beneficial impact over the long term.

Impacts on Recreation. Impacts on recreation resources would result in a definite shift of recreation opportunity spectrum classes resulting from forest management, mineral leasing, mining, and off-road vehicle use. Over the short term, the semi-primitive non-motorized classes in the more accessible areas of the unit would shift to semi-primitive motorized. New roads and trails would widen the impacts from off-road vehicles. Impacts on recreation over the short and long term would be a moderate beneficial impact to motorized recreation and a moderate adverse impact to non-motorized recreation.

Impacts on Off-Road Vehicles. Off-road vehicle use was discussed under the Recreation section.

All Wilderness Alternative Impacts

Under this alternative the entire WSA (26,050 acres) would be recommended preliminarily suitable for wilderness.

Impacts on Wilderness. The wilderness values and wilderness diversity outlined in the two previous alternatives would be protected in this alternative over the long term. The National Wilderness Preservation System would be expanded by this uncommon, ecologically diverse unit. An area with such ecological diversity (over 4,000 feet elevation difference) geologic uniqueness and high scenic values would be an important expansion to the diversity of the National Wilderness Preservation System. Overall, wilderness designation of this unit would be a moderate beneficial impact over the long term.

Impacts on Locatable Minerals. Under this alternative, the WSA would be closed to mineral entry. Based on the overall low potential, the adverse impacts would be considered minor in the long term.

Impacts on Oil and Gas. The WSA would be closed to leasing except for the valid existing right of the one pre-FLPMA oil and gas lease (120 acres). Based on low development potential, the overall impact from not allowing oil and gas development would be a minor adverse impact over the long term.

Impacts on Forestry. Timber management and harvesting would not be allowed under this alternative. Impacts would be the same as those described under the No Action Alternative.

Impacts on Recreation. Recreation opportunity spectrum settings and primitive recreation opportunities would be maintained under this alternative.

Issue/Resource Impacts Specific to WSAs

The area would be closed to off-road vehicle use which would enhance opportunities to experience outstanding solitude and primitive recreation opportunities. The beneficial impacts on primitive recreation would be considered moderate over the long term. The negative impacts to off-road vehicle use would be considered a moderate adverse impact over the long term because other suitable areas are also available in the region for off-road vehicle use.

Impacts on Off-Road Vehicles. Off-road vehicle use was discussed under the Recreation section.

Maximum Wilderness Alternative Impacts

Under this alternative all of The Palisade WSA and two cherry-stemmed roads (26,180 acres) would be recommended preliminarily suitable for wilderness.

Impacts on Wilderness. Impacts on wilderness would be essentially the same as those described under the All Wilderness Alternative. Two cherry-stemmed roads would be added to the WSA to enhance manageability and prevent motorized vehicle use on approximately 1 mile of road which runs into the unit (Fig. I-25). Opportunities to experience outstanding primitive and unconfined recreation would be enhanced by this action. Overall, this alternative would be a major long-term beneficial impact for wilderness.

Impacts on Locatable Minerals. Impacts under this alternative would be similar to those described under the All Wilderness Alternative. The mining claim, an associated cherry-stemmed road and mining camp, added back into this unit (Fig. I-23) would be evaluated for validity. If determined an invalid claim, the road would be rehabilitated and the dilapidated camp would be removed. These actions would be considered minor in the long term as potential for development is considered low.

Impacts on Oil and Gas. Impacts would be the same as those under the All Wilderness Alternative.

Impacts on Forestry. Impacts would be the same as those under the All Wilderness Alternative.

Impacts on Recreation. Impacts would be the same as those under the All Wilderness Alternative except the addition of two cherry-stemmed roads, which would enhance opportunities for primitive recreation on the west side of The Palisade.

Impacts on Off-Road Vehicles. Impacts would be the same as those described under the Recreation section of the All Wilderness Alternative.

Manageability Alternative Impacts

Under this alternative 19,215 acres of The Palisade WSA would be recommended preliminarily suitable for wilderness. Boundaries would be adjusted to minimize resource conflicts (Fig. I-26). Rights-of-way for hiking trails would be obtained to ensure manageability for wilderness.

Impacts on Wilderness. Under this alternative, the low land drainage area west of The Palisade, a crescent shaped area in Bull Draw, and a small pentagonal shaped area on the eastern edge would be removed because of off-road vehicle use and/or forestry conflicts.

This alternative would require the acquisition of three rights-of-way to minimize trespass and to make the unit manageable for wilderness. These rights-of-way are (1) a ridge trail to provide continuous public access from the unit's northwestern boundary to the northeastern boundary (Fish Creek), (2) an access trail along North Fork, and (3) another access trail along Fish Creek. Both of the latter would provide access to the WSA from State Highway 141.

Benefits of wilderness designation were discussed under the All Wilderness Alternative. The areas excluded from the WSA because of conflicts do not have high wilderness values. All of the excluded areas have some off-road vehicle use which has impacted naturalness. Some firewood and post cutting has occurred historically in the omitted areas on the southeast flank of the unit.

The planned rights-of-way acquisition for access would not only enhance opportunities for primitive and unconfined recreation but also provide better opportunities to move east and west in the unit and to access two creeks, one that provides fishing opportunities. Overall, designation of part of the unit and acquisition of three rights-of-way would be a major beneficial impact over the long term.

Impacts on Locatable Minerals. Under this alternative, the WSA would be closed to mineral location. Impacts would be similar to those described under the All Wilderness Alternative.

Impacts on Oil and Gas. Under this alternative, the unit would be closed to oil and gas leasing. The pre-FLPMA lease (120 acres) would be excluded from the unit. Overall, impact to closing the area to leasing would be a minor adverse impact over the long term based on low development potential.

Impacts on Forestry. The entire area would be unsuitable for pinyon-juniper management except for approximately 797 acres along the eastern boundary (Fig. I-26). This stand has fair to good productivity and good accessibility. Closing the unit

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to pinyon-juniper management except for the eastern end would be a minor adverse impact on forestry in the long term.

Impacts on Recreation. Off-road vehicle activities in the Bull Draw-Wright Draw area, the ease of motorized access, and some off-road vehicle use along the west side of The Palisade forced a boundary modification to minimize these conflicts. The off-road vehicle use is difficult to manage in this relatively flat drainage basin. As highlighted under the wilderness section, the western boundary would be moved to along the base of The Palisade while the Bull Draw boundary change would follow the southeastern base of The Palisade and then curve back to the east and southeast above Wright Draw (Fig. I-26). The two crescent shaped areas would delete 6,048 acres from the WSA and enhance its manageability for primitive recreation. Acquisition of the three rights-of-way, discussed under the Wilderness section, would also enhance primitive recreation use opportunities. Overall, this alternative with its modified boundary, would have a moderate beneficial impact over the long term on both motorized and non-motorized recreation.

Impacts on Off-Road Vehicles. Off-road vehicle impacts are discussed under the Recreation section.

Preferred Alternative Impacts

Under this alternative the Palisade WSA (26,050 acres) would be recommended unsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation would result in environmental impacts similar to those described under the No Action and No Wilderness Alternatives. This would be a moderate adverse impact to the National Wilderness Preservation System over the long term.

Impacts on Locatable Minerals. Under this alternative, the WSA would be open to mineral location; however, the mineral potential is low. Locatable minerals would not be impacted.

Impacts on Oil and Gas. The area would be open for oil and gas leasing except The Palisade itself (1,920 acres) which would be protected by a no surface occupancy stipulation. Impacts would be similar to the No Wilderness Alternative. There would be minimal adverse impacts to oil and gas over the long term.

Impacts on Forestry. The WSA would be available for pinyon-juniper woodland management and harvesting. The 1,654 acres of productive pinyon-juniper woodlands would be managed to protect scenic values. Timber harvesting would require special stipulations. Impacts would be similar to those discussed under the No Wilderness Alternative. Nondesignation would be a moderate beneficial impact to forestry over the long term.

Impacts on Recreation. An area of 1,920 acres centered on The Palisade would be managed as an outstanding natural area (ONA) to protect natural and scenic values. This area would also be managed as visual resource management Class I. These actions would maintain the semi-primitive non-motorized class in the outstanding natural area and enhance primitive, non-motorized use. The area outside the ONA would be managed as part of an intensive recreation management area to provide semi-primitive recreation.

The ONA would be closed to off-road vehicle use, and ORV use in the remainder of the WSA would be limited to designated roads and trails. Off-road vehicle use might, over time, dominate the use of the lower portion of the WSA. Nondesignation of the WSA would result in the loss of primitive recreation opportunities primarily in the lower basin areas that are accessible to motorized use. Primitive recreation uses would generally be maintained in the ONA and higher elevations of the unit. Overall, there would be a moderate beneficial impact on motorized recreation in the unit.

Impacts on Off-Road Vehicles. Off-road vehicle impacts are discussed under the Recreation section.

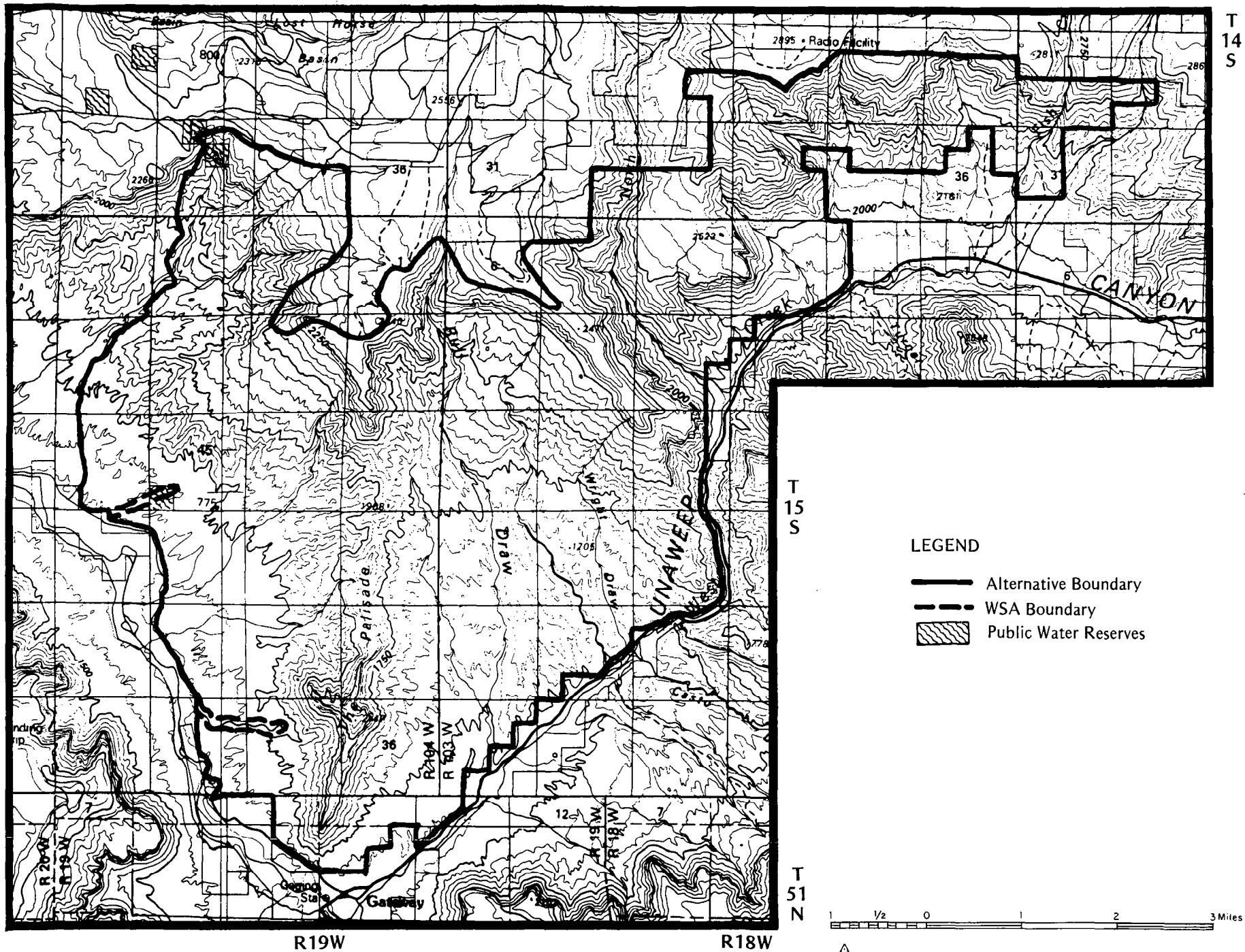


Figure I-25. Maximum Wilderness Alternative, The Palisade Wilderness Study Area.

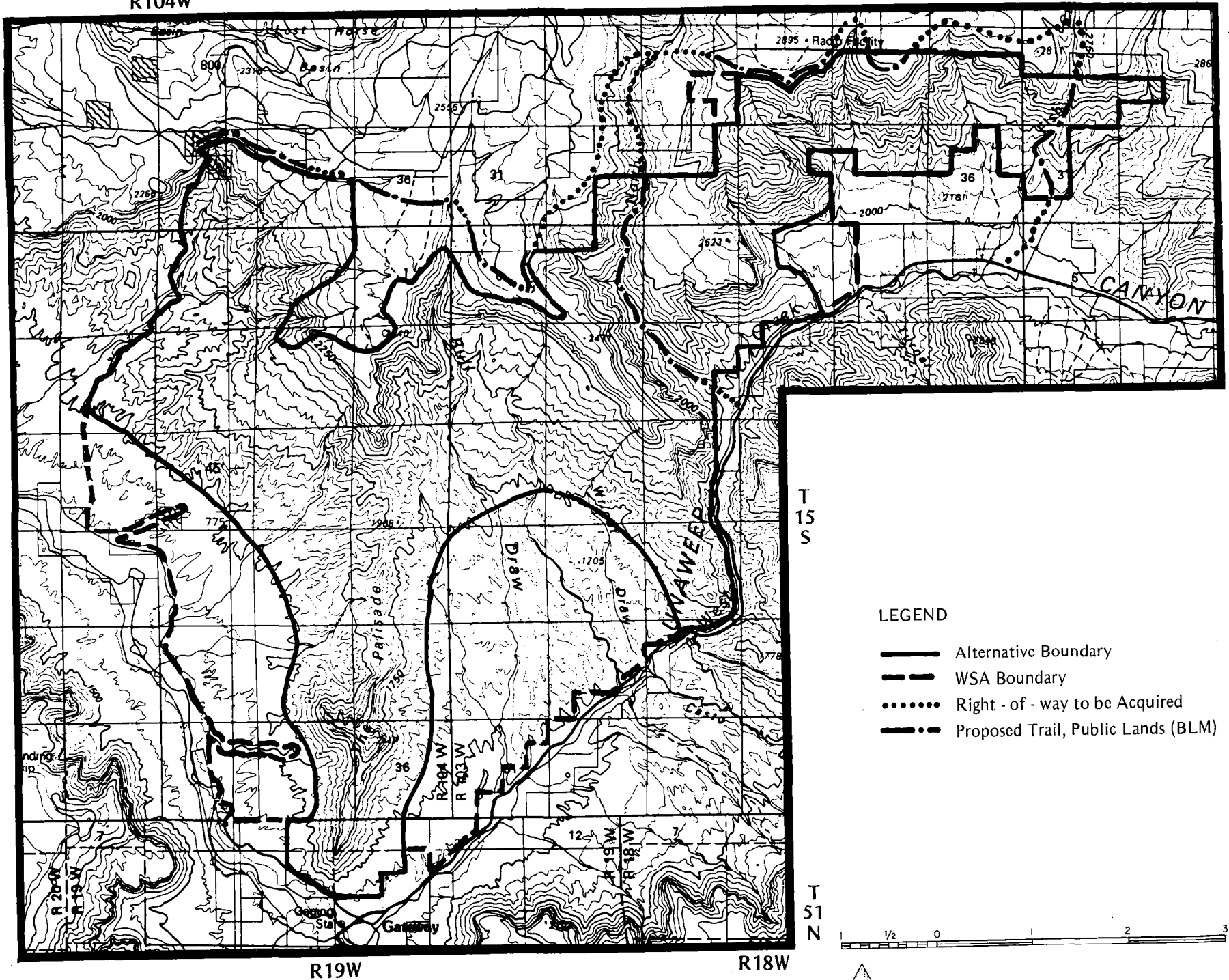


Figure I-26. Manageability Alternative, The Palisade Wilderness Study Area.

Issue/Resource Impacts Specific to WSAs

DOMINGUEZ CANYON WSA

No Action Alternative Impacts

Under this alternative, the entire Dominguez Canyon WSA (75,800 acres), would be recommended unsuitable for wilderness designation.

Impacts on Wilderness. Nondesignation of this WSA, the largest in Colorado, would limit comprehensive, long-term protection of the unit's very high quality wilderness values. It would prevent the WSA's physiographic features from being included in the National Wilderness Preservation System. This WSA is the largest undisturbed remnant of the 75-mile long Uncompaghre Plateau. The WSA's two major canyon systems and large undisturbed mesas provide a benchmark of change to the region.

Under this alternative, the WSA would be managed as wildland to protect its recreational and scenic values. Management would restrict oil and gas leasing in the canyons and other sensitive areas through a no surface occupancy stipulation, make the area unsuitable for utilities, make the 9,164 acres of productive pinyon-juniper woodland unsuitable for management and harvesting, and close the area to off-road vehicle use (except for three designated roads on the upland mesas). The area would be open for mineral location and a portion of the area would be leased for oil and gas (both low potential activities). The Star Mesa stock trail would severely impact the naturalness and primitive recreation in lower Dominguez Canyon.

Under the short term, wilderness values would probably be protected unless mineral activity increased quickly. The long-term possible loss of wilderness values and the failure to expand the ecological diversity of the National Wilderness Preservation System with this unit would be considered a major negative impact over the long term.

Impacts on Locatable Minerals. The WSA would be open to mineral location. The mining claimant working in Big Dominguez Canyon is the only miner known to be actively working his claims. The validity of these claims is not known and, therefore, the pre-FLPMA rights of these claims is not known. There would be no impacts on locatable minerals.

Impacts on Forestry. The upper mesas of this WSA have the most productive pinyon-juniper woodlands (9,164 acres) in the resource area. Under this alternative, these forest stands would be unsuitable for management and harvesting. The resultant loss would be a moderate impact over the long term.

Impacts on Wildlife. Under this alternative, up to 300 acres of vegetation would be manipulated and several water projects would be developed to benefit big game and upland game bird habitat. Harvesting of woodlands to benefit wildlife habitat would be lost and considered a negative impact. Benefits to wildlife would be minor over the long term.

Impacts on Livestock Grazing. The Star Mesa stock trail would be constructed from Big Dominguez Canyon up to Star Mesa. This is an identified range project in an approved allotment management plan. The overall impact from this project would be considered a long-term, moderate impact on the range program in this WSA.

Impacts on Recreation. The recreation opportunity spectrum settings would generally be maintained over the short term. Off-road vehicle use would be limited to three roads on the upper mesas. Mineral leasing, mining and mineral materials sales all have low development potential so their anticipated impacts from disturbance would be minimal. Off-road vehicles are generally excluded from the unit and the quality of the primitive recreation opportunities (mainly hiking) are very high.

Over time, off-road vehicle use and surface disturbance from approved mineral activities would impact the recreation opportunity spectrum settings. Anticipated changes would be considered major adverse impacts over the long term.

Impacts on Land Tenure. Under this alternative, no land acquisitions would be proposed.

Impacts on Transportation. There would be no transportation related impacts under this alternative.

No Wilderness Alternative Impacts

Under this alternative, the Dominguez Canyon WSA (75,800 acres) would be recommended unsuitable for wilderness designation.

Impacts on Wilderness. This alternative would result in the long-term loss of wilderness values and the failure to expand the ecological diversity in the National Wilderness Preservation System. The primary management emphasis would be on enhancing wildlife habitat. Pinyon-juniper and mountain shrub vegetation communities would be manipulated to improve habitat. Oil and gas leasing and development would be allowed where conflicts can be mitigated. Approximately one-fourth of the unit would be managed for forestry (9,164 acres). Timber sales would be designed to enhance wildlife habitat. The entire WSA would be open to mineral sales and mineral location. Allotment management plans would be implemented including any range

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identified projects. The Star Mesa stock trail would be constructed which would cause a severe impact on naturalness and primitive recreation in lower Big Dominguez Canyon. Off-road vehicle use of the WSA would be limited to existing trails in the canyon bottoms and open on the bench lands.

Surface-disturbing activities would result in the loss of wilderness values over the long term. The naturalness of the unit, especially its canyons, would be lost. Disturbance of the primitive settings and noises from mechanical activities would negate opportunities to experience outstanding solitude and outstanding primitive and unconfined recreation. Special features would be lost through surface disturbance in the long term. Overall, this would be a major adverse impact over the long term.

Impacts on Locatable Minerals. Impact would be similar to those discussed under the No Action Alternative.

Impacts on Forestry. The productive pinyon-juniper woodlands (9,164 acres) in the WSA would be designated suitable for management and harvesting. There would be moderately beneficial impact on forestry.

Impacts on Wildlife. Treatment of vegetation (up to 300 acres) and water development would be implemented to benefit wildlife. Forest activity plans would enhance wildlife habitat. Impacts would be the same as those under the No Action Alternative.

Impacts on Livestock Grazing. The Star Mesa stock trail would be constructed. Impacts would be the same as those described under the No Action Alternative.

Impacts on Recreation. Recreation impacts would be similar to those under the No Action Alternative except surface-disturbing activities, especially off-road vehicle use and vegetative treatments, would create a major impact to recreation in the short and long term. The area would be managed for back country use where not in conflict with wildlife and forestry goals. The general area of the canyons (12,000 acres) would be managed as an intensive recreation management area and vehicle use would be limited to designated roads and trails. Approximately 60,000 acres of the WSA would be open to ORV use. Over the long term, ORV use would expand over a major part of the upper mesas. Loss of primitive recreation opportunities would be a major adverse impact over the long term.

Impacts on Land Tenure. Under this alternative, there would be no proposed land acquisitions.

Impacts on Transportation. There would be no impacts on transportation under this alternative.

All Wilderness Alternative Impacts

Under this alternative, the entire Dominguez Canyon WSA (75,800 acres) would be recommended preliminarily suitable for wilderness designation.

Impacts on Wilderness. Wilderness designation would maintain the WSA's high quality wilderness values and would expand the ecological diversity of the National Wilderness Preservation System. The unit's wilderness and ecological diversity values are highlighted in the No Action Alternative. The unit's large size, geologic features, outstanding primitive recreation and solitude opportunities, and outstanding scenery would be protected under this alternative. The unit would be an outstanding addition to the National Wilderness Preservation System. Overall, designation would have a major beneficial impact over the long term.

Impacts on Locatable Minerals. The area would be withdrawn from mineral location. Existing claims would be evaluated for their validity if development were proposed, to determine future allowable operations. The mineral examination and mineral's report must confirm that as of the date of designation, minerals had been found that would constitute a valid claim. The minerals foregone in the WSA would not be considered a major adverse impact in the long term because of low minerals potential.

Impacts on Forestry. The 9,164 acres of productive pinyon-juniper woodland in this WSA would be classified unsuitable for management and harvest. This loss would be a moderate adverse impact in the long term even though the pinyon-juniper stands are of high productivity.

Impacts on Wildlife. Vegetation manipulations and water developments would be constrained but probably allowed under this alternative if the projects were located and designed to be consistent with the Wilderness Management Policy. Overall, impacts on wildlife would be beneficial.

Impacts on Livestock Grazing. The Star Mesa stock trail would not be permitted because of its severe impact on the wilderness values of Big Dominguez Canyon. About 170 feet of blasting would be required in sandstone cliffs located directly behind the Big Falls area of the canyon. The Big Falls is the major focus area of primitive recreation, and this project would directly impact the canyon's outstanding naturalness and outstanding opportunities for primitive and unconfined recreation. If the trail were not constructed, livestock trailing through the canyon would not be improved and the available forage on Star Mesa would not be used. Overall, under this alternative, impacts on livestock grazing would be moderately adverse in the long term if the trail were not constructed.

Issue/Resource Impacts Specific to WSAs

Impacts on Recreation. Recreation opportunity spectrum setting and primitive recreation opportunities would be maintained. The unit would be closed to off-road vehicles; however, some vehicle use would continue on the WSA's three cherry-stemmed roads. The ORV closure would enhance primitive recreation opportunities. Recreation use, because of the units' wilderness designation, past publicity and general knowledge by recreationists in the region, would probably increase in use by 10 to 15 percent annually. Wilderness designation of this unit over the long term would be a major beneficial impact.

Impacts on Land Tenure. Two parcels of land would be acquired to enhance wilderness manageability. Near the southern boundary, 600 acres of state land, owned by the Colorado Division of Wildlife (CDOW) would be acquired to block up the land ownership in this area. The CDOW is supportive of the acquisition. The parcel provides important big game habitat and would serve this purpose even if designated wilderness.

The 320 acres of private property in Little Dominguez Canyon would also be acquired to enhance manageability. The landowner lives on the property and is very supportive of wilderness designation for the Dominguez area. Negotiations for acquisition would not be initiated until Congress designates the WSA as wilderness. Acquisition would only be with the approval and support of the landowner. These land acquisitions would be considered major beneficial impacts over the long term.

Impacts on Transportation. None of the cherry-stemmed roads would be added to the WSA under this alternative. The trailheads at Big Dominguez Campground and Bridgeport would be maintained. A trailhead at Gunnison Gulch would be developed. Overall, there would be a minor beneficial impact for transportation from the trailheads.

Maximum Wilderness Alternative Impacts

Under this alternative, an expanded WSA acreage of 78,935 acres would be recommended preliminarily suitable for wilderness designation (Fig. 1-27).

Impacts on Wilderness. The environmental impacts for this alternative would be similar to those described under the All Wilderness Alternative. The main exception is that the three cherry-stemmed roads that enter the unit would be closed and added to the WSA. These roads enter about 3 miles of the WSA and continued motorized use on them would diminish opportunities to experience outstanding solitude and outstanding primitive and unconfined recreation. Vehicles traveling the mining access road in Big Dominguez Canyon would great-

ly disrupt these opportunities. There would be 1,000 acres of old chainings added to enhance manageability on Long Mesa. Chainings would be treated to appear like natural openings in the area. Overall, wilderness designation in this alternative would be a major long-term beneficial impact.

Impacts on Locatable Minerals. Impacts would be the same as those described under the All Wilderness Alternative except the cherry-stemmed road providing access to mining claims in Big Dominguez would be closed. This low impact road is approximately 3 miles long. After wilderness designation, continued use of this road (two tracks) would be used only in association with the mining claims. Overall, wilderness designation would have minor adverse impacts on locatable minerals.

Impacts on Forestry. Impacts would be similar to those described under the All Wilderness Alternative except several hundred acres of pinyon-juniper woodlands on Long Mesa would also be designated as unsuitable for management. Overall, impacts would be the same as those described under the All Wilderness Alternative.

Impacts on Wildlife. Impacts would be similar to those described under the All Wilderness Alternative.

Impacts on Livestock Grazing. Impacts would be the same as those described under the All Wilderness Alternative.

Impacts on Recreation. Impacts would be similar to those described under the All Wilderness Alternative except the addition of about 1,000 acres on Long Mesa and three cherry-stemmed roads (about 8 miles totally) would enhance opportunities to experience outstanding solitude and outstanding primitive recreation. These additional areas added into the WSA would have a moderate beneficial impact on recreation over the long term.

Impacts on Land Tenure. Impacts would be the same as those described under the All Wilderness Alternative.

Impacts on Transportation. Impacts would be similar to those described under the All Wilderness Alternative except for the three cherry-stemmed roads. All of these roads have minimal recreation use. The two roads in Big and Little Dominguez Canyons have a controlled access point at Bridgeport Bridge and are used for private property access, grazing administration, and mining claims access. All of these uses would be allowed under the *Wilderness Management Policy* with some constraints. Access to private property would be maintained. Grazing administration and access to mining claims would have to follow the minimum tool concept of the BLM's *Wilderness Management Policy*.

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The cherry-stemmed road into Star Mesa was constructed for access to construct two stock reservoirs and to provide grazing administration access. In 1983, the road was in poor condition and almost impassable west of Star Mesa. Some ORV use occurs on this road. Closing it would displace this activity elsewhere in the area. Again, vehicle access on the Star Mesa road would be allowed if it met the minimum tool requirement. Also, the need for the road would be lessened if the Star Mesa trail were not built. Overall, the closure of 8 miles of road in this WSA would be a minor adverse impact over the long term.

Manageability Alternative Impacts

Under this alternative a portion of the expanded Dominguez Canyon WSA (56,315 acres) would be recommended preliminarily suitable for wilderness (Fig. I-28).

Impacts on Wilderness. Impacts would be similar to those described under the All Wilderness and Maximum Wilderness Alternatives. However, the boundary of the unit would be modified to resolve a resource conflict with forestry and to minimize problems of trespass onto private property along Escalante Canyon and the Gunnison River. A total of 2,642 acres would be excluded from this alternative to provide for management of highly productive pinyon-juniper stands. Approximately 19,000 acres were excluded from the southern and eastern boundaries to enhance wilderness manageability and prevent possible conflicts with adjacent private lands. Overall, the boundary changes would not seriously diminish wilderness values. Wilderness designations of this unit with these boundary adjustments would greatly enhance the manageability of the unit and be a major beneficial impact on the National Wilderness Preservation System in the long term.

Impacts on Locatable Minerals. Impacts would be the same as those described under the All Wilderness and Maximum Wilderness Alternatives. There would be minor adverse impacts on locatable minerals over the long term.

Impacts on Forestry. Boundary adjustments would be made on Horse Mesa, Upper Dominguez Canyon, Long Mesa, Middle Mesa, Steamboat Mesa and Wagon Park to exclude 2,642 acres of productive pinyon-juniper woodlands from the area recommended preliminarily suitable for wilderness (Fig. I-28). A total of 6,522 acres inside the unit would be designated unsuitable for forest management and harvesting. Overall, the loss of 6,522 from forest management in this resource area would be a moderate adverse impact over the long term.

Impacts on Wildlife. Impacts would be the same as those described under the All Wilderness Alternative. Constraints imposed by wilderness management policy would change how projects would be done but probably not adversely modify desired wildlife benefits. Wilderness designation would generally have a beneficial impact over the long term.

Impacts on Livestock Grazing. The Star Mesa stock trail would be further evaluated for compatibility with protection of wilderness values. The project may or may not be built.

Impacts on Recreation. Impacts would be similar to the All Wilderness Alternative except for major boundary modification along Escalante Canyon and the Gunnison River. Problems of trespass were briefly discussed under the wilderness section. Some recreation users have inadvertently trespassed onto private lands along Escalante Canyon and Dominguez Canyon. The adjusted boundary follows topographic features and legal subdivisions and is located far enough from Escalante Canyon and the Gunnison River to discourage trespass.

Overall, opportunities for primitive recreation are still outstanding in this unit. None of the pinyon-juniper woodland areas excluded from the unit would have a major impact on the canyons' primitive recreation opportunities. Areas deleted along Escalante Canyon and the Gunnison River are on the periphery of the unit and would have a minor impact on the WSA's primitive recreation. The major canyons and larger upland areas are still inside the WSA. Wilderness designation would be a major beneficial long-term impact.

Impacts on Land Tenure. Impacts would be the same as those described under the All Wilderness Alternative. Acquisition of 920 acres would be a major beneficial long-term impact.

Impacts on Transportation. Impacts would be essentially the same as those described under the All Wilderness Alternative. An additional mile of the Long Mesa jeep road would be open under this alternative. Closure of 7 miles of road would have a minor adverse impact over the long term.

Preferred Alternative Impacts

A major part of the Dominguez Canyon WSA (56,305 acres) would be recommended preliminarily suitable for wilderness designation. The Manageability Alternative was selected as the Preferred Alternative; therefore, its environmental impacts would be the same as those described under the Manageability Alternative.

Issue/Resource Impacts Specific to WSAs

SEWEMUP MESA WSA

No Action Alternative Impacts

Under this alternative, the entire Sewemup Mesa WSA (19,140 acres) would be recommended non-suitable for wilderness designation.

Impacts on Wilderness. Nondesignation of this WSA would prevent long-term protection of the unit's very high quality wilderness values. Nondesignation would also prevent adding this uncommon pinyon-juniper ecosystem to the National Wilderness Preservation System. There are no other mesas of this size and natural quality in western Colorado that have not been developed, especially from the uranium mining boom of the 1950s. Its value as a benchmark to change would be lost with nondesignation.

Botanical values are very high because of the general lack of grazing; rare plants are common on the mesa top.

Under this alternative, Sewemup Mesa would be managed as a wildland to protect recreational and scenic values. The area would be closed to mineral leasing, off-road vehicle use, and timber harvesting. These actions would help to maintain the area's naturalness, outstanding opportunities for solitude and primitive and unconfined recreation, and special features. This WSA is characterized by important cultural sites, geologic features and natural and botanical values.

In the short term, these values would probably be maintained unless there was major activity in the WSA for locatable minerals (WSA would be open to location). The long-term possible loss of wilderness values and the failure to expand the ecological diversity of the National Wilderness Preservation System with this unit would be considered a major adverse impact over the long term.

Impacts on Water. Under this alternative, a low profile cut-off wall and associated facilities (power line, pipeline, pump, etc.) would be constructed along Salt Creek on the northern boundary of this WSA to pump saline water back into Sinbad Valley for disposal.

The project is part of the Sinbad Valley Salinity Control Project. The operation of the cut-off wall and treatment of the saline water would remove 5,000 to 7,000 tons of salt each year from the Colorado River. Overall, this would be a moderate beneficial impact to the Colorado River Basin annually.

Impacts on Locatable Minerals. Under this alternative, the area would be open to mineral location. Although mineral reports have indicated the unit's mineral potential is low, the success of the

present mining on the west side of Sinbad Valley may create a mining boom that could involve the base area of Sewemup Mesa. Similar mineralizations occur on both sides of Sinbad Valley. The overall impact of future mining is unknown until the value of the ore is known.

Impacts on Oil and Gas. Under this alternative, approximately one-third of the WSA could be leased for oil and gas. Of the 6,943 acres available, 5,283 acres would be restricted to no surface occupancy. The likelihood for development is moderate. The no leasing condition on the top of Sewemup Mesa would prevent development on 12,197 acres. The impact from the loss of oil and gas is considered moderate over the long term.

Impacts on Recreation. Under this alternative, the recreation opportunity spectrum class of primitive on the mesa top would be maintained over the short term. Over the long term, the class would shift toward semi-primitive non-motorized due to mining activity (low potential) and mineral sales. The lower area, in the short term, would shift from semi-primitive non-motorized to semi-primitive motorized resulting from mineral location, mineral material sales and off-road vehicle activity (the area is limited to existing roads). Overall, this would be a major negative impact over the long term on non-motorized recreation use.

Impacts on Utility Rights-of-Way. Under this alternative, utility rights-of-way along Highway 141 would not be allowed inside the WSA. Power lines, telephone lines and pipelines would have to be routed east of the highway (between the Dolores River and Highway 141 or east of the river).

There would be minor adverse impacts over the short term and major adverse impacts over the long term. An alignment along the west side of the highway and along the WSA boundary would probably have the least amount of visual impact.

No Wilderness Alternative Impacts

Under this alternative, the entire Sewemup Mesa WSA (19,140 acres) would be recommended non-suitable for wilderness designation.

Impacts on Wilderness. Nondesignation would result in the loss of wilderness values and opportunity to expand the diversity of the National Wilderness Preservation System. These values were summarized in the No Action Alternative.

The management emphasis of this alternative is to make resources available for development. The unit would be open for oil and gas leasing, mineral location and mineral material sales. Since there are no roads in the WSA, a major access road would

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have to be built if development were to occur. However, the probability for mineral development is low. A road would also be required to manage and harvest approximately 3,472 acres of productive pinyon-juniper stands. Off-road vehicle use in the WSA would be limited on the mesa top and open below.

These surface-disturbing activities would destroy the area's natural, outstanding opportunities for solitude, outstanding opportunities for primitive and unconfined recreation and special features. The WSA's high quality naturalness and rare plants would be disturbed. Overall, this change brought about through resource production would be a major adverse impact over the long term.

Impacts on Water. Impacts would be the same as those described under the No Action Alternative.

Impacts on Locatable Minerals. The unit would be open for mineral location. Impacts would be the same as those described under the No Action Alternative.

Impacts on Oil and Gas. The entire WSA would be available for leasing and development. There would not be any impacts on oil and gas.

Impacts on Recreation. Surface-disturbing activities including oil and gas leasing, mineral location, mineral materials sales, open off-road vehicle designation in the lower area and forest management would shift the recreation opportunity spectrum classes on the mesa top from primitive to semi-primitive non-motorized and semi-primitive motorized (when roads are built) and from semi-primitive non-motorized to semi-primitive motorized in the lower area. Overall, this would be a major adverse impact over the long term on non-motorized recreation.

Impacts on Utility Rights-of-Way. Under this alternative, utilities would be permitted throughout the unit. Future utility lines along Highway 141 would be allowed to enter the WSA and even cross the top of Sewemup Mesa. There would be more flexibility in routing lines. Without a specific alignment, overall impacts would be difficult to assess.

All Wilderness Alternative Impacts

Under this alternative, the entire Sewemup Mesa WSA (19,140 acres) would be recommended preliminarily suitable for wilderness designation.

Impacts on Wilderness. Wilderness designation would protect the WSA's high quality wilderness values, and its addition to the National Wilderness Preservation System would greatly enhance the representation of the Colorado Plateau Province in this system. The unit's wilderness values were sum-

marized in the No Action and No Wilderness Alternatives. This unit is perhaps the last, undisturbed, publicly-owned, high pinyon-juniper mesa in western Colorado, and under this alternative its outstanding naturalness including its unmodified landform and variety of plant life would be maintained. Its plants are atypical of the region because the mesa has had only very limited historical grazing. Its landform would add a new ecotype to the National Wilderness Preservation System. Its outstanding scenery, outstanding opportunities for solitude and outstanding primitive and unconfined recreation opportunities together with its important cultural resources and geologic features would all be protected over the long term under this alternative. Wilderness designation of this high quality area would have a major beneficial impact over the long term.

Impacts on Water. The northern boundary of the WSA includes the proposed project area for the cut-off wall and associated facilities for the Sinbad Valley Salinity Control Project. This alternative would preclude construction of this salinity control project. Consequently, 5,000 to 7,000 tons of salt would continue to be added to the Colorado River Basin annually. This would be a moderate adverse impact over the long term.

Impacts on Locatable Minerals. Under this alternative, the area would be closed to mineral location. The impact of minerals lost would be estimated to be low to moderate over the long term.

Impacts on Oil and Gas. Under this alternative, there would be no leasing of oil and gas in the WSA. Any oil and gas reserve present would be foregone. No leasing would also impact the adjacent Dolores River Canyon where the Dolores River and Highway 141 generally prevent any drilling operations. The only physical space available would have been along the eastern boundary of the WSA (west of the highway) which is closed to leasing.

Impacts on Recreation. Wilderness designation would maintain the present recreation opportunity spectrum classes and protect the primitive recreation settings. Outstanding opportunities for solitude and primitive and unconfined recreation would also be maintained.

Maintaining the recreation opportunity spectrum setting and ensuring the continuation of the current primitive recreation opportunities would be a major beneficial impact over the long term.

Impacts on Utility Rights-of-Way. Under this alternative, the area would be unsuitable for utilities. Impacts would be the same as those described under the No Action Alternative.

Issue/Resource Impacts Specific to WSAs

Maximum Wilderness Alternative Impacts

There is no Maximum Wilderness Alternative because the WSA was not expanded in size.

Manageability Alternative Impacts

Almost the entire Sewemup Mesa WSA (18,835 acres) would be recommended preliminarily suitable for wilderness designation (Fig. I-29).

Impacts on Wilderness. Impacts would be similar to those described under the All Wilderness Alternative. Minor boundary changes were made on all sides of the WSA. The boundary was moved to 200 feet from the south shore of Salt Creek on the WSAs north side to prevent conflicts with the Sinbad Valley salinity control project (projects along Salt Creek). On the east side, the boundary (which excludes private property) was moved back to 400 feet from the centerline of Highway 141. This would eliminate conflicts with future utility rights-of-way and oil and gas drilling in Dolores River Canyon. The boundary on the west side was modified to a north-south line which would be easier for visitors to recognize in the field. A very minor boundary change was made on the south side in Garvey Gulch to realign the boundary along topographic features to aid recognition in the field. All of these enhance the unit's manageability for wilderness.

The west and south side boundary adjustments would help the wilderness visitor recognize the wilderness boundaries and reduce potential trespass onto private land. The removal of the 200-foot strip on the north and east sides would have minimal impacts on the wilderness values. The high escarpments surrounding the mesa would remain in the unit under this alternative. Overall, addition of the unit to the National Wilderness Preservation System would be a major beneficial impact in the long term.

Impacts on Water. Under this alternative, the northern boundary would be modified to allow construction of the cut-off wall and related facilities for the Sinbad Valley Salinity Control Project. Allowing this construction in Salt Creek would be a moderate beneficial impact to the Colorado River drainage in the long term.

Impacts on Locatable Minerals. Because no definite minerals resource is known, no attempt was made to draw boundaries around the mineral-

ization area. If a significant resource was discovered along the fault lines at the base of the escarpment, a serious conflict could exist because of the high wilderness and scenic values along the cliffs. The cliffs and the basal area are considered an integral part of the Sewemup Mesa landform. The area would be closed to mineral entry which would be a minor to moderate adverse impact over the long term.

Impacts on Oil and Gas. Under this alternative, the eastern boundary would be pulled back to 400 feet from the centerline of Highway 141 except along two parcels of private property. In this way, directional drilling could help recover oil and gas reserves east of the WSA. The remainder of the WSA would be closed to oil and gas leasing, thereby preventing any recovery of oil and gas on 18,305 acres. This loss would be considered a minor adverse impact over the short and long term. Making physical space available for drilling along the eastern boundary would be a minor beneficial impact over the long term because of limited knowledge of the oil and gas resource in this area.

Impacts on Recreation. Impacts would be the same as those described under the All Wilderness Alternative. Boundary modifications would have only minimal adverse impacts on primitive recreation. Wilderness designation would be a major beneficial impact to recreation over the long term.

Impacts on Utility Rights-of-Way. Under this alternative, future utilities along Highway 141 would have flexibility in routing to reduce impacts in this highly scenic Dolores River-Sewemup Mesa corridor. A 400-foot strip parallel to the centerline of Highway 141 would be available for future utilities. This increased flexibility for utility routing would be a moderate beneficial impact over the long. Minimizing visual impacts in this corridor would be the major benefit of this boundary modification. Loss of the remainder of the unit for right-of-way routing would be a minor impact over the long term.

Preferred Alternative Impacts

The Sewemup Mesa WSA (18,835 acres) would be recommended preliminarily suitable for wilderness designation. The Manageability Alternative was selected as the Preferred Alternative; therefore, its environmental impacts would be the same as those described under the Manageability Alternative.

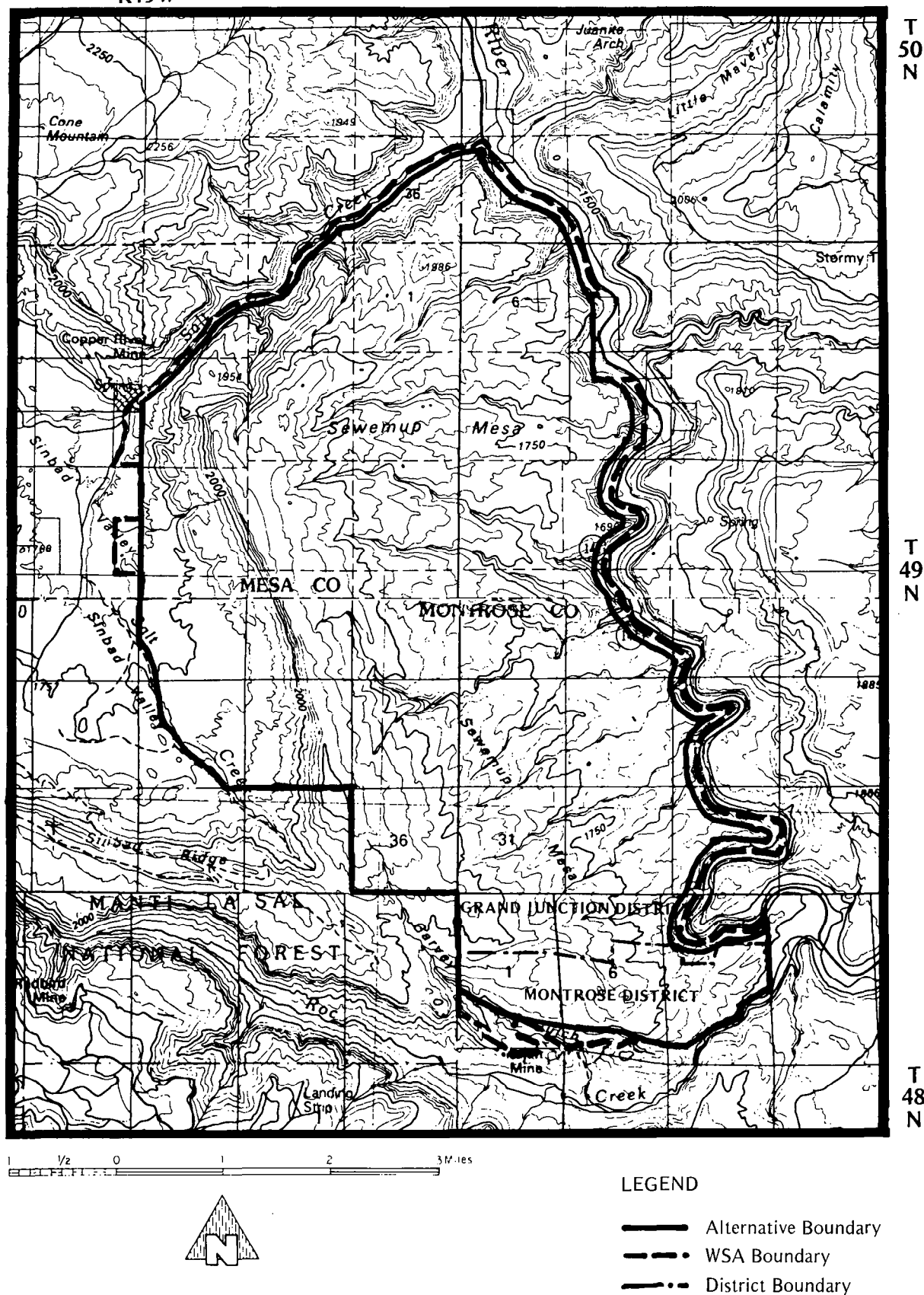


Figure I-29. Manageability and Preferred Alternatives, Sewemup Mesa Wilderness Study Area.

CHAPTER 5

MANAGEMENT OF SUITABLE AREAS NOT DESIGNATED WILDERNESS (PREFERRED ALTERNATIVE)

INTRODUCTION

The BLM *Wilderness Study Policy* requires that in an RMP/EIS where wilderness study areas are recommended as preliminarily suitable for wilderness designation, backup alternatives be identified for management of these WSAs in the event the areas are not ultimately designated wilderness by Congress. This chapter describes how the four WSAs recommended preliminarily suitable for wilderness in the Preferred Alternative would be managed should Congress not designate them as wilderness. The four WSAs recommended in the Preferred Alternative in Chapter 2 are (1) Black Ridge Canyons, (2) Black Ridge Canyons West, (3) Dominguez Canyon, and (4) Sewemup Mesa.

This chapter also presents the environmental consequences of not designating these four WSAs as wilderness. The organization of the environmental consequences is the same as that presented in Chapter 4 of this appendix.

PROPOSED MANAGEMENT

BLACK RIDGE CANYONS AND BLACK RIDGE CANYONS WEST WSAs

Most of these two WSAs (68,000 acres) would be managed as described in the RMP/EIS emphasis area A-1 under the Continuation of Current Management Alternative (No Action Alternative). This 68,000 acre area would be designated the Black Ridge Recreation Lands and managed to preserve and enhance recreation values. The area would be withdrawn from mineral entry and would not be available for oil and gas leasing except for a one-half mile buffer around the edges which would be subject to the no surface occupancy stipulation. The area would also be closed to pinyon-juniper management and harvest. Suitable habitat would be provided for the reintroduction and management of bighorn sheep. Off-road vehicle use would be limited to existing roads and trails. Except for a

small utility corridor on the eastern edge of the Black Ridge Canyons WSA, the area would be identified as unsuitable for public utilities.

DOMINGUEZ CANYON WSA

The canyon systems in this WSA would be managed to provide for backcountry recreation and protection of scenic values. The entire area would be open to mineral entry. Approximately, 8,042 acres would be available for oil and gas leasing with the no surface occupancy stipulation to protect the canyon systems. About 6,522 acres of productive pinyon-juniper woodland and 17 acres of commercial forest land would be identified as unsuitable for management and harvest. Off-road vehicle use would be limited to designated roads and trails. The Star Mesa livestock trail would be constructed from Big Dominguez Canyon up to Star Mesa to improve livestock distribution and increase forage utilization. Sport fisheries would be improved in Big and Little Dominguez Canyons. Habitat for bighorn sheep would be enhanced through vegetation treatments. The deer and elk range south of Little Dominguez Canyon would be closed to surface disturbance from December 1 to May 1.

SEWEMUP MESA WSA

The top of Sewemup Mesa, approximately 13,000 acres, would be designated as an outstanding natural area and managed to protect the area's natural and scenic values. The entire WSA would be withdrawn from mineral entry but would be available for oil and gas leasing and development with the no surface occupancy stipulation. The top of Sewemup Mesa would be closed to off-road vehicle use. Facilities in Salt Creek as part of the Sinbad Valley Salinity Control Project would be permitted. The cliffs in the southeast portion of Sinbad Valley would be designated and managed as visual resource management (VRM) Class 1. Other cliffs surrounding Sewemup Mesa would be designated as VRM Class II. The entire WSA would be designated unsuitable for public utilities except for a

small 400-foot wide corridor parallel to Colorado Highway 141. Approximately 3,470 acres of productive pinyon-juniper woodland and 434 acres of commercial forest land would be classified unsuitable for management and harvest.

ENVIRONMENTAL CONSEQUENCES

Unless specifically addressed below, non-issue resources and issue resources common to WSAs discussed in Chapter 4 of this appendix also apply to this analysis.

BLACK RIDGE CANYONS AND BLACK RIDGE CANYONS WEST WSAs

Impacts on Wilderness

Nondesignation of the Black Ridge Canyons and Black Ridge Canyons West WSAs in this alternative prevent long-term protection of the units' very high wilderness values. Nondesignation would also result in not expanding the ecological diversity of the National Wilderness Preservation System. Under this management recommendation, the units would be managed as recreation lands to preserve and enhance recreation values. Withdrawing the area from mineral entry, prohibiting oil and gas leasing or surface occupancy, and identifying the area as unsuitable for timber management and harvesting would all generally protect the area from surface-disturbing activities and help preserve opportunities for outstanding solitude and primitive recreation. The special features found within the area would generally be preserved.

Limiting vehicle use to existing roads and trails would adversely impact outstanding opportunities for solitude and primitive recreation on the upper benches and mesas. Vegetation manipulation projects to benefit wildlife would have minimal adverse effects on naturalness if the projects are designed to protect these values. Overall, nondesignation would be a major adverse long term impact on wilderness values primarily based on the adverse impacts of not adding these two outstanding units to the National Wilderness Preservation System. Under this management recommendation, the threat to wilderness values would be low to moderate over the long term.

Impacts on Minerals

Withdrawing 68,000 acres from mineral entry would have low impacts on locatable minerals. This is due to the low occurrence and development potential of any locatable minerals within the two WSAs.

Impacts on Oil and Gas

Prohibiting oil and gas leasing or development on these 68,000 acres would have low impacts on oil and gas. The area is nonprospectively valuable for oil and gas, and any potential for development activity is considered low.

Impacts on Forestry

Closing the area to pinyon-juniper harvesting and management would be a minor adverse impact over the long term.

Impacts on Wildlife

Providing suitable habitat for bighorn sheep would be a long term moderate beneficial impact. Forest management and harvest would not be available to benefit wildlife. Overall, there would be moderate beneficial impacts on wildlife.

Impacts on Recreation

Recreational opportunity setting classes would remain static over the short term although off-road vehicle use could shift primitive and semi-primitive non-motorized classes to semi-primitive motorized recreation opportunities over the long term. This would be a major adverse impact to primitive recreation opportunities and a moderate beneficial impact to motorized recreation opportunities. Overall implementation of this management recommendation would have moderate beneficial impacts on recreation opportunities.

Impacts on Off-Road Vehicles

Limiting off-road vehicle use to existing roads and trails would have a low to moderate beneficial impact on trail-oriented vehicle use.

Impacts on Transportation

There would be no impacts on the present transportation system.

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Impacts on Utility Rights-of-Way

Provision of a utility corridor on the eastern edge of the area would have major, long term, beneficial impacts on residents in the Glade Park area. Designating the remainder of the area as unsuitable for public utilities would have low to moderate adverse impacts on potential users. This is because of the increased distance any potential power line or pipeline would have to traverse.

DOMINGUEZ CANYON WSA

Impacts on Wilderness

Nondesignation of this WSA in this alternative would prevent long term protection of the unit's very high quality wilderness values. Nondesignation would also result in not expanding the ecological diversity of the National Wilderness Preservation System. Management of the canyon systems to provide for backcountry recreation and scenic values would help to protect wilderness values in those area. Allowing oil and gas leasing and development within the canyons with the no surface occupancy stipulation would help to protect wilderness values in the canyons. Limiting off-road vehicle use to designated roads would help to protect the area's outstanding opportunities for solitude and primitive recreation. Allowing development of the Star Mesa livestock trail would have a moderate, long term impact on the naturalness and primitive recreation values of lower Big Dominguez Canyon.

Overall, nondesignation would be a major adverse, long term impact on wilderness values, especially in not adding this area to the National Wilderness Preservation System. Wilderness values in the canyon systems would be moderately degraded over the long term and would be lost in the remainder of the area in the long term. The ecological diversity of the National Wilderness Preservation System would also be adversely impacted by not including the area's high quality wilderness values in the system.

Impacts on Minerals

Permitting mineral entry on the 75,000 acres contained within this WSA would have low beneficial impacts on locatable minerals. This is because of the low potential for locatable minerals development within the area.

Impacts on Oil and Gas

Most of the WSA lies within a nonprospectively valuable area for oil and gas. Generally, this includes the areas where leasing would be prohibited or where oil and gas leasing would be permitted with the no surface occupancy stipulations. Thus, the adverse impacts on oil and gas would be low.

Impacts on Forestry

Prohibiting management and harvesting of 6,522 acres of productive pinyon-juniper woodland, out of the 9,164 acres within the WSA, would be a low adverse impact on forestry. Some of the most productive pinyon-juniper woodlands in the entire resource area are located on the upper mesas in the WSA. These remaining 2,642 acres of highly productive pinyon-juniper are suitable for management and harvest.

Impacts on Wildlife

Providing suitable habitat for bighorn sheep would be a moderate long term beneficial impact. A seasonal closure south of the Little Dominguez Canyon would be a moderate beneficial impact to deer and elk over the long term. Improvement of the fisheries in Big and Little Dominguez Creeks would be a moderate beneficial impact over the long term.

Impacts on Livestock Grazing

Construction of the Star Mesa livestock trail, as identified in the *Grand Junction Grazing Environmental Statement*, would have minor, long term, beneficial impacts on the grazing program within the resource area, but would have moderate, long term, beneficial impacts within the allotment.

Impacts on Recreation

The semi-primitive non-motorized and primitive settings in the canyons would generally be maintained over the long term. Outside the canyons, the recreation opportunity spectrum classes might change toward semi-primitive motorized. This would be a moderate adverse impact on primitive and semi-primitive settings and a low beneficial impact on motorized recreation opportunities.

Limiting off-road vehicles to designated roads and trails would have minimal adverse impacts on cross-country vehicle use and moderate beneficial impacts on trail-oriented vehicle use.

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Impacts on Land Tenure

There would be no land acquisition in this alternative.

Impacts on Transportation

There would be no impacts on transportation.

SEWEMUP MESA WSA

Impacts on Wilderness

Nondesignation of the Sewemup Mesa WSA in this alternative would have moderate adverse impacts on wilderness values. However, nondesignation would also result in not including the outstanding wilderness and natural values found within this area in the National Wilderness Preservation System. This would be a major adverse impact.

Designating the top of Sewemup Mesa as an outstanding natural area and managing to protect its natural and scenic values, would protect the area's outstanding wilderness values, including the natural values and outstanding opportunities for solitude and primitive recreation. Withdrawing the entire area from mineral entry and prohibiting forest management and harvesting would also protect these values and opportunities. This would be a major, long term, beneficial impact on wilderness values.

Permitting a corridor along Colorado Highway 141 and developing the Sinbad Valley Salinity Control Project in Sinbad Valley would have minor, long term, adverse impacts on wilderness values. Closing the mesa top to off-road vehicles would have a moderate beneficial impact on wilderness values.

Overall, nondesignation would be a major, long term, adverse impact on wilderness values primarily based on not adding the outstanding wilderness values and other special features found within the Sewemup Mesa WSA to the National Wilderness Preservation System. However, under this management recommendation, the threat to wilderness values would be low.

Impacts on Water

Providing for development of the Sinbad Valley Salinity Control Project on the northern boundary of the WSA would have minor, long term, beneficial impacts on controlling salinity in the Colorado River Basin.

Impacts on Minerals

Closing the entire WSA to mineral entry would have low to moderate adverse impacts on locatable minerals. It is difficult to determine the relative impacts with the limited information available.

Impacts on Oil and Gas

Prohibiting surface occupancy for oil and gas development would have low to moderate adverse impacts. The area is prospectively valuable for oil and gas, but low development activity is anticipated. Directional drilling could be used to develop part of the area but would result in higher drilling cost. Overall, there would be low to moderate, long term, adverse impacts on oil and gas development.

Impacts on Recreation

The primitive recreation opportunity spectrum class on the top of Sewemup Mesa would be maintained. This would be a major, long term, beneficial impact on primitive recreation opportunities. The semi-primitive nonmotorized recreation opportunities below the cliffs might be changed to semi-primitive motorized opportunities due to ORVs. This would be a moderate adverse impact on primitive recreation opportunities and a low beneficial impact on motorized recreation opportunities in the long term. Overall, there would be a major, long term, beneficial impact on primitive recreation through protection of the area's outstanding natural and scenic values.

Closing the top of Sewemup Mesa to off-road vehicle use would have low adverse impacts on vehicle use over the long term. This is because of the inaccessibility of the area under present conditions.

Designating the top of Sewemup Mesa and the cliffs of Sinbad Valley within the WSA as Visual Resource Management Class I and the remainder of the cliffs surrounding Sewemup Mesa as Visual Resource Management Class II would provide long term protection to the high important and visually sensitive resources. This would be a high, long term, beneficial impact on visual resources within the WSA.

Impacts to Utility Rights-of-Way

Designating the top of Sewemup Mesa as unsuitable for public utilities would have low, long term, adverse impacts on public utilities. This is due to the very low probability for this area being used for

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public utilities. Provision for a utility corridor along Colorado Highway 141 would give flexibility in routing rights-of-way, and thereby reducing visual impacts, along the highly scenic Dolores River. This

increased flexibility would be a minor, short term, beneficial impact but a major, beneficial impact to public utilities over the long term.

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ACRONYMS

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ACEC. <i>Area of Critical Environmental Concern</i>	MFP. <i>Management Framework Plan</i>
AMP. <i>Allotment Management Plan</i>	MMBF. <i>Million Board Feet</i>
APD. <i>Application for Permit to Drill</i>	NSD. <i>No Surface Disturbance</i>
AUM. <i>Animal Unit Month</i>	NSO. <i>No Surface Occupancy</i>
CA. <i>Commodity Alternative</i>	ONA. <i>Outstanding Natural Area</i>
CCMA. <i>Continuation of Current Management Alternative</i>	ORV. <i>Off-Road Vehicles</i>
CDOW. <i>Colorado Division of Wildlife</i>	P-J. <i>Pinyon-Juniper</i>
CFL. <i>Commercial Forest Land</i>	PA. <i>Preferred Alternative</i>
EA. <i>Environmental Assessment</i>	ProA. <i>Protection Alternative</i>
EIS. <i>Environmental Impact Statement</i>	RMP. <i>Resource Management Plan</i>
FLPMA. <i>Federal Land Policy and Management Act</i>	RNA. <i>Research Natural Area</i>
FS. <i>Forest Service, U.S.</i>	ROD. <i>Record of Decision</i>
FWS. <i>Fish and Wildlife Service</i>	SMA. <i>Special Management Area</i>
GJRA. <i>Grand Junction Resource Area</i>	SNV. <i>Scenic and Natural Values</i>
GMU. <i>Game Management Unit</i>	SRP. <i>Special Recreation Permit</i>
HMP. <i>Habitat Management Plan</i>	T&E. <i>Threatened and Endangered Species</i>
IBLA. <i>Interior Board of Land Appeals</i>	TPCC. <i>Timber Production Capability Classification</i>
IMP. <i>Interim Management Policy</i>	URA. <i>Unit Resource Analysis</i>
IRMA. <i>Intensive Recreation Management Area</i>	VRM. <i>Visual Resource Management</i>
KGS. <i>Known Geologic Structure</i>	WHR. <i>Wild Horse Range</i>
LBCWHR. <i>Little Book Cliffs Wild Horse Range</i>	WSA. <i>Wilderness Study Area</i>
LBCWSA. <i>Little Book Cliffs Wilderness Study Area</i>	

GLOSSARY

GLOSSARY

- ADMINISTRATIVE ACCESS.** A nonexclusive easement which, when properly executed, grants to the United States and its assignees the right to use, maintain, improve, and repair the road access. This type of easement is acquired when it is necessary to gain legal access across private property for management of the resources associated with the adjacent public property. This type of easement does not normally allow for general public use of the access acquired.
- ALLOWABLE HARVEST.** The acreage of forest land, suitable and available under specified management plans for sustained production of timber products, that would be cut during a given period. The given period is annual or decadal. The anticipated volume yield is expressed in cords for fuelwood and in million board feet for sawtimber.
- ANIMAL UNIT (AU).** A 1,000-pound grazing animal or its equivalent in food requirements. Equals 1 mature cow (with or without calf), 1 horse, 1.5 elk, 5 sheep, mule deer, or pronghorn antelope.
- ANIMAL UNIT MONTH (AUM).** The amount of forage required to support one animal unit for one month. Equals 720 pounds (dry weight) of consumed forage or 1,800 pounds of forage production at 40 percent to be utilized.
- APPLICATION FOR PERMIT TO DRILL (APD).** The form filed by oil and gas operators to initiate a well drilling project.
- AUM OF USE.** Unit of stocking pressure on a range. The number of animals to use an area divided by the number of individuals of that species equaling one AU multiplied by the number of months of use.
- AQUIFER.** A water bearing stratum or zone below the ground surface capable of producing water as from a well.
- BAJADA.** A long, sloping plain of a wide valley above the flood plain.
- BASEFLOW.** Water that enters stream channels from springs or ground water seepage.
- BASIN.** A land area drained by a river and its tributaries.
- BROWSE.** The part of a leaf and twig growth of shrubs, woody vines, and trees utilized by animals for food.
- CATCHMENT.** A structure built to collect and retain water.
- CAVITY NESTER.** One of up to 50 species of vertebrate wildlife that shelter and raise young within hollow parts of trees.
- CHERRY STEM.** Fingerlike intrusion into a wilderness study area (WSA) that is not part of the WSA; an example is a dead end road where WSA boundaries follow edge of road.
- CLEARCUTTING SYSTEM.** An even-aged silvicultural system where the old crop is cleared at one time; regeneration is generally natural through seeding from adjacent stands or from cone bearing slash.
- COMMERCIAL FOREST LAND.** Forest land bearing or capable of bearing timber of commercial character and economically available now or prospectively for commercial use and not otherwise withdrawn from such use.
- COVER/FEEDING AREA RATIO.** The percent of a wildlife species range with vegetation primarily useful for shelter from wind and harassment relative to that primarily useful for gathering forage.
- CRITICAL RANGE.** The portion of land used by a population or herd of a wildlife species that is vital to the survival of that population or herd.
- CULTURAL REMAINS.** All prehistoric and historic physical evidence of past human activity which can be used to reconstruct lifeways and cultural history of past peoples. These include sites, artifacts, environmental data, and other relevant data.
- CULTURAL RESOURCES.** Those fragile and non-renewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human events.
- CUMULATIVE IMPACTS.** The collective impacts of all actions affecting a particular resource.
- DRILLING MUD.** The liquid circulated through the well bore during rotary drilling operations.
- ECOLOGICAL.** Of or pertaining to a natural ecosystem; especially relationships between biological organisms and their environments.
- ECOSYSTEM.** A community, including all the component organisms together with the environment, forming an interacting system.
- EDGE.** The zone of contact between two different vegetation types. Represents an area with high diversity.
- ENDANGERED SPECIES.** Any species, or significant population of the species, in danger of extinction throughout all or a significant portion of its ranges. Usually refers to those on lists of species recognized by federal and state governments to be endangered.
- ENVIRONMENT.** Means water, air, land, all plants, man and other animals living therein, and the interrelationships that exist among them.
- ESCARPMENT.** A long precipitous, clifflike ridge of land, rock or the like commonly formed by faulting or fracturing of the earth's crust.
- EXTENSIVE RECREATION MANAGEMENT AREA (ERMA).** Area of public land where management actions to facilitate recreation use are limited primarily to providing basic information and public land stewardship responsibilities.
- FIRE MANAGEMENT CATEGORIES.** Describe the fire management actions that would be taken in each zone.
- CRITICAL SUPPRESSION.** Taking of immediate, aggressive action to contain and control fire. Human and equipment resources committed at continually increasing rate until fire is contained.
- FULL SUPPRESSION.** Taking of aggressive action to contain and control fire by 10 a.m. of day following ignition.
- LIMITED SUPPRESSION.** Taking of minimal action ranging from monitoring to minimal containment actions in areas where firefighter risks and suppression costs are high. Fires in these areas are considered to have positive or neutral effects on resource values.
- PRESCRIBED FIRE.** Fire intentionally ignited to meet land/resource management objectives. Fires are burned pursuant to a predetermined set of parameters set forth in a management plan. Fire objective is generally to improve range or habitat.
- WILDERNESS TREATMENT.** A form of limited suppression. Response actions are minimal and are determined using environmental considerations. Fires occurring in areas designated are considered to be a natural part of the ecosystem.
- FLOOD PLAIN.** Level land adjacent to a stream that is periodically submerged by flood water.
- FORB.** Herbaceous plant neither grass nor resembling grass.
- GAME MANAGEMENT UNIT.** A Colorado Division of Wildlife map unit for big game.
- GROUND WATER.** The water beneath the surface of the ground, consisting largely of surface water that has seeped down; the source of water in springs and wells.
- GUZZLER.** A small catchment, usually to provide water to wildlife.
- HABITAT SITE.** A mapped unit of land containing a distinct set of vegetation characteristics.
- INTERIM MANAGEMENT POLICY.** The Department of Interior policy that mandates BLM to manage lands under wilderness review so as not to impair wilderness values and to protect Congress' right to make the wilderness designation decision.
- IMPRINTS OF MAN.** Man made changes in a natural landscaping such as a cabin or trail.
- INDICATED.** Using drill hole information, the coal resource is calculated from the measured boundary out to three-quarters of a mile from the drill hole.

Glossary

- INDICATOR SPECIES.** A species used to represent a larger group of species. Used by land management agencies to detect effects of habitat change.
- INFERRED.** Coal resources are calculated using measured and indicated data to make a projection on the volume where data is not available.
- INTENSIVE RECREATION MANAGEMENT AREA (IRMA).** Areas of public land where major investments in recreation facilities and/or visitor management are authorized. Management objectives must relate to reducing resource damage, solving visitor health and safety problems, and mitigating land use and user conflicts. These areas provide the public with scarce recreation opportunities which are not readily available from other public or private sources.
- KNOWN GEOLOGIC STRUCTURE (KGS).** The trap in which an accumulation of oil and gas has been discovered and has been determined to be productive. The limits of this structure include all the acreage that is presumptively productive.
- LEACHING.** The removal of materials in solution from the soil.
- LEAVE STRIP (LEAVE AREA).** The portion of a land treatment project that is of the same vegetation type being transformed and is being left untreated within the project site.
- MEASURED.** Using drill hole information, the coal resource is calculated out to one-quarter mile from the drill hole.
- NATIONAL FOREST LAND.** Land administered by the United States Forest Service.
- NATIONAL REGISTER OF HISTORIC PLACES (NRHP).** The official list, established by the *Historic Preservation Act* of 1966, of the nation's cultural resources worthy of preservation.
- NO-SHOOTING ZONE.** An area of public land where use of firearms is prohibited at all times.
- NO SURFACE OCCUPANCY (NSO).** The oil and gas lease stipulation that prohibits any surface use of the lease.
- NOT PROSPECTIVELY VALUABLE (NPV) FOR OIL AND GAS.** Lands with less than 1,000 feet of sediments and lacking the formations. These lands are not considered to be prospectively valuable for oil and gas.
- OFF-ROAD VEHICLE (ORV).** Any motorized vehicle capable of or designed for travel on or immediately over land, water, or other natural terrain.
- OFF-ROAD VEHICLE DESIGNATIONS.**
- OPEN.** Designated areas and trails where off-road vehicles may be operated (subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343).
 - LIMITED.** Designated areas and trails where the use of off-road vehicles is subject to restrictions such as limiting the number or types of vehicles allowed, dates and times of use (seasonal restrictions), limiting use to existing roads and trails, or limiting use to designated roads and trails. Under the designated roads and trails designation, use would be allowed only on roads and trails that are signed for use. Combinations of restrictions are possible such as limiting use to certain types of vehicles during certain times of the year.
 - CLOSED.** Designated areas and trails where the use of off-road vehicles is permanently or temporarily prohibited. Vehicle use can be permitted for emergency purposes and special permitted uses.
- ONE HUNDRED-YEAR FLOOD PLAIN.** The lowland near the channel of a watercourse which has been or may be covered by water of a flood of one hundred-year frequency, as established by engineering practices of the U.S. Army Corps of Engineers and/or the Colorado Water Conservation Board.
- OUTSTANDING NATURAL AREA (ONA).** An area having significant or representative natural or scenic values or features where physical or biological processes are allowed to prevail. An outstanding natural area shall be managed to maintain or enhance the natural condition of the area while allowing such recreational use as can be made without unduly impairing the values for which the area was designated.
- PARK LAND.** Land administered by the National Park Service.
- PHYSIOGRAPHIC REGION.** An extensive portion of the landscape normally encompassing many hundreds of square miles which portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin.
- PRE-FLPMA.** Occurring prior to the passage of the *Federal Land Policy and Management Act*, October 21, 1976. Pre-FLPMA mineral leasing and mining claims generally have special rights for development in WSAs.
- PRODUCTIVE WOODLAND.** Forest land bearing or capable of bearing vegetative products of commercial character and economically available now or prospectively for commercial use and not otherwise withdrawn from such use. Fuelwood is the most common product harvested.
- PROSPECTIVELY VALUABLE (PV) FOR OIL AND GAS.** Lands with greater than 1,000 feet of sediments and having potentially productive formations. These lands are considered to be prospectively valuable for oil and gas.
- PUBLIC LAND.** Land administered by the Bureau of Land Management.
- PUBLIC ROAD.** An exclusive road easement when properly executed grants to the United States perpetual, exclusive control of the right-of-way across private property for road purposes. This easement allows for access by the general public.
- PUBLIC TRAIL.** A general easement that allows flexibility in the language used. For public trail acquisitions, the public will be allowed nonmotorized use. Flexibility in the wording of the easement may take into account certain requirements that the landowner wishes to be included.
- RANGE SITE.** A mapping unit of land that represents the distinctive vegetation type that does or would exist on that ground if left undisturbed long enough to become a stable vegetation community. A U.S. Soil Conservation Service term.
- RAPTOR.** Vultures and birds with sharp, prey-grasping talons; e.g., eagles, hawks, owls.
- RECREATION OPPORTUNITY SPECTRUM (ROS).** A continuum used to characterize recreation opportunities in terms of physical setting, recreation activity, and experience opportunities. (See ROS Appendix H for more detail.)
- RESEARCH NATURAL AREA (RNA).** A land management status which reserves the area for uses that are compatible with the resource of interest to research for which the area was designated.
- RIPARIAN.** Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or subirrigation zone of streams, ponds, and springs.
- SALINITY.** Total solids dissolved in water such as sodium chloride (table salt).
- SEDIMENT YIELD.** The amount of sediment produced in a watershed, expressed as tons, acre-feet, or cubic yards of sediment per unit of drainage area per year.
- SENSITIVE RECREATION SETTING.** Areas of public land which presently receive special, protective management concern due to the presence of high quality recreation opportunities and settings. Protection of high quality outdoor recreation opportunities is a constraint on other competing land uses.
- SENSITIVE SPECIES.** Species recognized by some public authority to be rare enough for consideration as endangered, in serious decline, or locally rare and of high interest.
- SHELTERWOOD SYSTEM.** An even-aged silvicultural system where, in order to provide a source of seed and protection for regeneration, the old crop is removed in two or more successive cuttings.
- SHORT TON.** 2,000 pounds.
- SNAG.** A standing dead tree from which the leaves and most of the branches have fallen, or a standing section of the stem of a tree broken off at a height of 20 feet or more. If less than 20 feet, properly termed a stub.
- SOIL ASSOCIATION.** A mapping unit used on general soil maps, in which two or more defined taxonomic units occurring together in a characteristic pattern are combined because the

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- scale of the map of the purpose for which it is being made does not require delineation of the individual soils.
- STAND.** An aggregation of trees or other growth occupying a specific area and sufficiently uniform in composition (species), age, arrangement, and condition as to be distinguishable from the forest or other growth on adjoining areas.
- THREATENED SPECIES.** Any species, or significant population of that species, likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Usually includes only those that have been recognized and listed as threatened by federal and state governments.
- TRAILHEAD.** An access point from which a hiking trail enters a recreation area. Area provides signing and orientation to the area as well as parking.
- UNDERSTORY.** That portion of a plant community growing underneath the taller plants on the site.
- VEGETATION MANIPULATION.** Planned alteration of vegetation communities by using fire, plowing, herbicide spraying, or other means to gain desired changes in forage availability, wildlife cover, etc.
- VEGETATION TYPE.** A plant community with immediately distinguishable characteristics based upon and named after the apparent dominant plant species.
- VERTEBRATE.** An animal having a backbone or spinal column.
- VISUAL RESOURCES.** The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).
- VISUAL RESOURCE MANAGEMENT (VRM).** The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.
- VISUAL RESOURCE MANAGEMENT (VRM) CLASSES.** Identify the degree of acceptable visual change within a characteristic landscape. VRM classes are assigned to public land through management decision, using the guidelines of scenic quality, visual sensitivity, and visibility. The value of land uses which may be affected plays an important, constraining role in determining VRM decisions.
- Class I:** Preserve the existing character of the landscape. Includes Congressionally authorized areas (e.g., wilderness) and areas approved through the RMP where the goal is to provide a landscape that appears unaltered by man.
- Class II:** Retain the existing character of the landscape. The level of landscape change should be low. Management activities may be seen but should not attract the attention of the casual observer.
- Class III:** Partially retain the existing character of the landscape. The level of landscape change may be moderate. Management activities may attract attention but should not dominate the view of the casual observer.
- Class IV:** Provide for management activities which require major modification of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and other landscape management practices.
- VISUAL SENSITIVITY.** Visual sensitivity levels are a measure of public concern for scenic quality and existing or proposed visual change.
- WILDERNESS.** Definition contained in Sec. 2(c) of the *Wilderness Act* of 1964 (78 Stat. 891): "A wilderness in contrast with those areas where man and his own works dominate the landscape is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean...an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological or other features of scientific, educational, scenic, or historical values."
- WILDERNESS CHARACTERISTICS.** Identified by Congress in the 1964 *Wilderness Act*: namely, size, naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values such as geological, archaeological, historical, ecological, scenic, or other features. It is required that the area possess at least 5,000 acres or more of contiguous public land or be of a size to make practical its preservation and use in an unimpaired condition; be substantially natural or generally appear to have been affected primarily by the forces of nature, with the imprint of man being substantially unnoticeable; and have either outstanding opportunities for solitude or a primitive and unconfined type of recreation. Congress stated that a wilderness area may also have supplemental values.
- NATURALNESS.** Refers to an area that "generally appears to have been affected primarily by the focus of nature, with the imprint of man's work substantially unnoticeable" (Sec 2(c) of the *Wilderness Act*, 1964).
- ROADLESS.** Refers to absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use (a way maintained strictly by the passage of vehicles does not constitute a road).
- SOLITUDE.** The state of being alone or remote from others; isolation. A lonely or secluded place. Factors influencing solitude may include: size, natural screening and the ability of the user to find a secluded spot.
- WILDERNESS MANAGEMENT POLICY.** Policy document prescribing the general objectives, policies, and specific activity guidance applicable to all designated BLM wilderness area. Specific management objectives, requirements, and decisions implementing administrative practices and visitor activities in individual wilderness areas are developed and described in the wilderness management plan for each unit.
- WILDERNESS STUDY AREA (WSA).** Roadless area of land that has been inventoried and found to have wilderness characteristics as described in Section 603 of *Federal Land Policy and Management Act* and Section 2(c) of the *Wilderness Act* of 1964 (78 Stat. 891).
- WILDERNESS VALUES.** Wilderness characteristics and multiple resource benefits of an area.
- WILDLAND AREA (ALSO WILDLAND STUDY AREA).** A land management designation developed in past management framework plans to address wilderness and primitive types of recreation management. This terminology resulted from a hiatus in firm policy concerning designations for backcountry recreation management. The void in policy has since been addressed with wilderness study area policy. Wildland areas have been managed to protect high quality natural and scenic values and opportunities for primitive types of recreation, such as would be found in semi-primitive non-motorized and primitive recreation opportunity spectrum setting management.

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